

JPRS 71739

23 August 1978

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS  
ENGINEERING AND EQUIPMENT  
No. 45

USSR

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23 August 1978

# USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

## ENGINEERING AND EQUIPMENT

No. 45

This serial publication contains abstracts of articles and news items from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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<b>BIBLIOGRAPHIC DATA SHEET</b>	1. Report No. JPRS 71739	2.	3. Recipient's Accession No.
4. Title and Subtitle USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS - ENGINEERING AND EQUIPMENT, No. 45		5. Report Date 23 August 1978	
7. Author(s)		8. Performing Organization Rept. No.	
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201		10. Project/Task/Work Unit No.	
		11. Contract/Grant No.	
12. Sponsoring Organization Name and Address		13. Type of Report & Period Covered	
		14.	
15. Supplementary Notes			
16. Abstracts  The report contains abstracts and news items on aeronautical, marine, mechanical, automotive, civil and industrial engineering, related research and development, and engineering materials and equipment.			
17. Key Words and Document Analysis. 17a. Descriptors  USSR Eastern Europe Aeronautics Industrial Engineering Marine Engineering Stress Analysis Turbines Metrology			
17b. Identifiers/Open-Ended Terms			
17c. COSATI Field/Group 1A, 13H, 13J, 14B			
18. Availability Statement Unlimited Availability Sold by NTIS Springfield, Virginia 22151		19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 77
		20. Security Class (This Page) UNCLASSIFIED	22. Price PCA05

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USSR

UDC 533.6.011.3+518.5

A METHOD OF CALCULATING THE AERODYNAMIC PITCH, ROLL AND YAW DERIVATIVES OF AN AIRCRAFT AT SUBSONIC VELOCITIES

Moscow IZVESTIYA AKADEMII NAUK SSSR: MEKHANIKA ZHIDKOSTI I GAZA in Russian No 2, Mar/Apr 78 pp 77-88 manuscript received 14 Jul 76

GANIYEV, F. I., Moscow

[Abstract] An examination is made of the motion of an aircraft of complex spatial configuration at constant subsonic velocity in an ideal compressible medium. A method is proposed for computer calculation of the aerodynamic pitch, roll and yaw derivatives and the induced drag of the aircraft with consideration of the thickness of the lifting elements and pylons of the aircraft as it undergoes low-frequency harmonic oscillations during motion. The method enables fairly precise calculation of aerodynamic characteristics of an aircraft of any configuration. The limitation of the method is the development of critical phenomena--flow separation and zones of supersonic flow. The author thanks N. N. Tyunin for furnishing experimental data. Figures 5, references 12: 11 Russian, 1 Western.

USSR

UDC 532.529

EXPERIMENTAL STUDY OF A TWO-PHASE FLOW WITH LIQUID PARTICLES IN THE SUBSONIC AND TRANSONIC REGIONS OF FLAT NOZZLES

Moscow IZVESTIYA AKADEMII NAUK SSSR: MEKHANIKA ZHIDKOSTI I GAZA in Russian No 2, Mar/Apr 78 pp 167-170 manuscript received 5 Aug 77

BARANOVSKIY, S. I., YEFREMOV, N. M., ZLOBIN, V. V., LEPESHINSKIY, I. A. and TIKHONOV, B. A., Moscow, Tallin

[Abstract] A previous paper [V. V. Zlobin, "Investigation of the Distribution of a Solid Admixture in Axisymmetric Nozzles," IZV. AN SSSR: MEKH. ZHID. I GAZA, No 4, 1975] dealt with the results of experimental studies of conditions of entry, particle size, the profiles of the subsonic and transonic parts of the nozzle and initial concentration as they influence the distribution of a discrete solid phase in the outlet section of axisymmetric nozzles. In this paper, which is a continuation of the previous one, the authors give the results of a study of the influence that nozzle profiling and particle sizes at the nozzle inlet have on the formation of fields of distribution of a discrete liquid phase and particle size at the outlet of flat nozzles. The liquid phase was water droplets measuring 48-100  $\mu$ m. Convergent wedge and profiled nozzles were studied with different radii of curvature in the critical section. Optical laser methods were used for

measuring volumetric concentration and particle size. The results show that for relatively large droplets the profiling of the convergent part of the nozzle has a considerable effect on the nature of motion of the dispersed phase, and provides a convenient means for controlling particle distribution at the outlet. Uniformity of the fields of concentration of discrete phase is maximized by wedge-shaped and convex inlet profiles. Figures 5, references 3 Russian.

USSR

UDC 529.781:629.783:525

METHOD OF DETERMINATION OF THE TIME OF TRANSMISSION OF PRECISE TIME SIGNALS  
THROUGH SATELLITE RELAY LINKS

Moscow IZMERITEL'NAYA TEKHNIKA in Russian, No 8 Aug 77, pp 52-54  
IVANOVA, YU. D.

[Abstract] A method of determination of the time of transmission of a signal from earth station to a satellite and back to another earth station is analyzed. The method does not require the use of the predicted orbital parameters of the satellite and allows the accuracy of synchronization to be increased. An equation is derived from the transmission time of the signal which, in combination with three equations for the coordinates of the receiving point, can be used to determine the transmission time and thus synchronize time scales over long distances from the state time standard. Figure 1; Tables 4; Reference 1 Russian.

USSR

UDC 533.6.011.55

MOTION IN AN ATMOSPHERE OF LOW-DENSITY GAS BODIES

Moscow IZVESTIYA AKADEMII NAUK SSSR: MEKHANIKA ZHIDKOSTI I GAZA in Russian  
No 2, Mar/Apr 78 pp 89-93 manuscript received 16 Apr 77

KUTSAYEV, A. S., Moscow

[Abstract] The author considers the motion of a gas cloud toward the earth at hypersonic velocity along its own axis of symmetry. The center is the middle of the axis of symmetry and the height is the altitude of the center. A departing shock wave is formed in front of the cloud as soon as it enters sufficiently dense air. The pressure and density of the two-dimensional oncoming flow around the cloud are functions of altitude. The problem is

numerically solved by S. K. Godunov's method of straight-through calculation for two-dimensional unsteady flows [S. K. Godunov, A. V. Zabrodin, G. P. Prokopov, "Chislennoye resheniye mnogomernykh zadach gazovoy dinamiki" (Numerical Solution of Multidimensional Problems in Gas Dynamics), Moscow, Nauka, 1976]. A numerical solution is given for vertical entry of an air cloud with 1-km radius at 40 km/s at an altitude of 120 km. Assuming an exponential atmosphere, graphs are given showing the process of increasing shock wave intensity and replacement of the rarefaction wave by a compression wave in the trailing hemisphere. Curves are given showing the velocity and altitude of the cloud as functions of time. Comparison with the analytical solution for an undeformable homogeneous sphere with the same initial radius and density shows divergence where the cloud begins to decrease in size. The minimum size of the cloud occurs in the region of maximum deceleration. The authors thank G. I. Petrov for directing the work. Figures 5, references 6 Russian.



## Construction

USSR

### DETERMINATION OF THE REACTION OF LONG BUILDINGS AND STRUCTURES CONSIDERING THE INITIAL PHASE OF TRANSMISSION OF A SEISMIC WAVE

Yerevan IZVESTIYA AKADEMII NAUK ARMYANSKOY SSR, SERIYA TEKHNICHESKIKH NAUK in Russian, No 4, 1977, pp 37-47, manuscript received 28 Feb 77

KHACHIYAN, E. YE., AMBARTSUMYAN, V. A., PETROSYAN, L. G., Armenian Scientific Research Institute of Construction and Architecture; Yerevan Polytechnical Institute imeni K. Marx

[Abstract] Equations are derived for the motion of long, multistorey frames as a seismic wave passes through, considering its initial phase. Some quantitative data are presented on the influence of the length of the frame on the reactions of systems with one degree of freedom. Problems of integration of the equations of motion with a fixed accelerogram of motion of the foundation are discussed. 1-, 2-, 3-, 4-, and 5- span frames are analyzed, with identical length and identical soil conditions. It is found that the number of intermediate supports has little influence on the seismic load and that the total length of the structure is the major factor of importance. Table 1; Figures 3; References 12: 11 Russian, 1 Western.

USSR

UDC 699.841:517.946

### EQUATIONS OF VERTICAL OSCILLATIONS OF BUILDINGS CONSIDERING DEFORMATION OF THE FLOORS AND FOUNDATIONS

Tashkent IZVESTIYA AN UZ SSR, SERIYA TEKHNICHESKIKH NAUK in Russian No 6, Jun 77 pp 39-33, manuscript received 37 Jan 77

RASSKAZOVSKIY, V. T., and MUKUK, L. K., Institute of Mechanics and Earthquake-Proofness of Structures imeni M. T. Urazbayev of the Uzbek SSR Academy of Sciences

[Abstract] The effects of the vertical component of seismic forces on high-rise buildings are analyzed. The deformations of the floors and foundations are taken into account in a model consisting of a cantilever on a rigid or elastic foundation with the mass of the supported walls distributed over their height or the masses of rigid or elastic floors lumped or distributed over a strip beam. The cantilever is divided into sections with the masses of the floors at the division points, and the cross-section is variable. The floors can be considered rigidly or elastically connected to the walls, and equations are presented for all combinations of these possibilities. The equations can be used to determine the displacements and the stresses arising in any cross-section of high-rise buildings with various structural parameters in the presence of vertical vibrations.

USSR

UDC 551.501:624.4

METEOROLOGIC EFFECTS ON A SUSPENDED GAS PIPELINE CROSSING

Moscow STROITEL'STVO TRUBOPROVODOV in Russian, No 4, Apr 78, pp 25-27

KAZAKEVICH, M. I., Central Scientific Research Institute for Planning of Steel Structures, Dnepropetrovsk

[Abstract] Where a gas pipeline crosses the Amudar'ya River, a suspended crossing 660m in length has been constructed. During the initial period of operation of the gas pipeline, measurements were conducted in order to refine the estimated wind load on the structure, estimate the temperature modes of the air, of the metal structures of the rigidity beam and of the pipe and to study the actual rigidity of the structure and its reaction to meteorological effects. The air temperature, wind speed and direction, temperature of the gas pipeline and metal structures of the rigidity beam were measured at least three times per day. Stresses on the line were measured, and a wind rose was constructed, showing predominant west winds for half the year, east winds the other half. Wind loads were found to cause swinging of the pipeline, but wind resonance was not observed. The results and analysis of observations indicated that a more serious attitude should be taken toward collection of information on meteorological effects, particularly of vital structures.

USSR

UDC 627.824.7.001.42

RESULTS OF STUDIES OF THE CREEP OF CONCRETE IN THE MASS OF THE TOKTOGUL'SKAYA HYDROELECTRIC POWERPLANT DAM

Moscow GIDROTEKHNICHESKOYE STROITEL'STVO in Russian, No 4, Apr 78, pp 19-24

PUKHOV, I. E.

[Abstract] Creep studies of the concrete used in the Tiktogul'skaya dam were conducted using specimens 3 days to 3 years of age and stress levels up to one-half of the prism compressive strength of the concrete. Concrete of various compositions differing significantly in creep at early age, was found to have approximately the same creep at later stages of curing. The creep of older concrete depended little on compressive strength or cement content. Older concrete is also far less sensitive to temperature changes in terms of their effect on creep. The creep of a large mass of old concrete can be determined by testing large-diameter cores cut from the concrete, if steps are taken to eliminate moisture loss from the cores. Figures 7; Tables 3; References 7: 6 Russian, 1 Western.

USSR

THE NATURE OF BEEDING OF MATERIAL OF AN AVALANCHE DAM AT MEDEO

Moscow GIDROTEKHNICHESKOYE STROITEL'STVO in Russian, No 4, Apr 78, pp 18-19

SKOROVOGATOV, A. V.

[Abstract] To protect the city of Medeo from mud slides, a dam was constructed on the Malaya Almatinka River by explosion of two directed charges, 5.3 kilotons on the right bank and 4.0 kilotons on the left bank. Charges in secondary blast holes were shot first, followed after a few seconds by the main charges. The resulting avalanches produced a heap of soil 80m high at the bottom of the ravine. Normal earthmoving methods were then used to continue construction of the dam to its final height of 143m. Eight pits were dug into the body of the dam to study the bedding of the material and decide whether a grout curtain was needed. The data presented indicates that the material of the dam is generally well compacted, settling over five months having averaged 5 cm. When water-retaining dams are constructed by this method, the blast chambers should be placed at the level of the planned crest of the dam or slightly higher, to protect the abutments.

USSR

UDC 627.82.012.4:624.15

CHANGES IN ENGINEERING-GEOLOGICAL CONDITIONS IN THE FOUNDATION OF THE BRATSK HYDROELECTRIC POWERPLANT DAM DURING 15 YEARS OF OPERATION

Moscow GIDROTEKHNICHESKOYE STROITEL'STVO in Russian, No 4, Apr 78, pp 12-18

SUKHANOV, G. K., SAVINSKAYA, M. K., TIZDEL', R. R. and SOTNIKOVA, N. P.

[Abstract] Field observations of the rock foundation beneath the Bratsk Hydropower Dam have been conducted continuously and carefully, beginning during the period of construction. The dam is a concrete gravity dam with expanded seams, 125m in height and 924m in length. The head of NBL is 106m. The dam was constructed in 42 column sections which were subsequently cemented together. The anchor of the dam is up to 15m deep. Two rows of drainage wells 30m deep and 3m apart were drilled into the foundation beneath the dam. The observations indicate that the status of the foundation and the stability of the channel and left bank earth dam are quite satisfactory. The changes in engineering and geological conditions that are unavoidable upon construction of a large dam have apparently been completed, and the new conditions in the foundation of the dam have stabilized. The drainage devices are operating normally. However, observations should be continued at full volume.

USSR

UDC 624.073.016.04

DETERMINATION OF THE PRESTRESSING OF A SHEET DIAPHRAGM WITH A DEFORMABLE  
REINFORCED-CONCRETE CONTOUR

Moscow STROITEL'NAYA MEKHANIKA I RASCHET SOORUZHENIY in Russian, No 1,  
1978, pp 13-16

AYUBOV, G. A., SVETOV, A. A., Scientific Research Institute for Reinforced  
Concrete, Moscow

[Abstract] A study is made of the stress-strain state of a sheet diaphragm attached to reinforced concrete side elements with the two main longitudinal elements prestressed, the transverse elements unstressed. The sheet membrane is attached to the longitudinal and end transverse ribs, but not to the intermediate transverse ribs. The solution of the problem considers the stress-strain state of the ribs, not only in bending and compression, but also in twisting, very important for this system of diaphragm construction with reinforced-concrete side ribs. The problem is stated of determining the conservative preliminary stresses in the diaphragm after it is assembled, considering the type of deformation of the side reinforced-concrete elements. The greatest effect of prestressing of the diaphragm is achieved when the supporting contour has minimal compliance. Preservation of prestressing in the diaphragm is influenced by the bending rigidity of the end rib. Theoretical and experimental data agree well (within 10%), confirming the correctness of using the method presented for determination of residual stresses in a diaphragm carried on a prestressed reinforced-concrete contour. Figures 2; Table 1; References 3 Russian.

USSR

UDC 624.0074.04:69.001.5:519.2

SELECTION OF CALCULATION MODELS OF RIGIDITY DIAPHRAGMS FOR MULTISTORY  
BUILDINGS ON THE BASIS OF EXPERIMENTAL STUDIES

Moscow STROITEL'NAYA MEKHANIKA I RASCHET SOORUZHENIY in Russian, No 1,  
1978, pp 55-59

PODOL'SKII, D. M., BAINATOV, ZH. B., Kiev Zonal Scientific Research and  
Planning Institute for Standard and Experimental Planning of Residential  
and Public Buildings

[Abstract] A practical method is presented for selection of calculation models of construction structures, developed on the basis of the theory of statis colutions. One problem, is that, in formalizing the calculation of poorly defined systems such as multistory buildings, the initial calcula-

tion data may be very approximate. Experimental studies were performed to produce quantitative estimates of the stress-strain state of rigidity diaphragms by testing of a series of small-scale models manufactured to allow the deformations to be measured with high accuracy. A special modeling material consisting of Portland cement, sand and polyvinyl acetate emulsion was used. A photograph of the model is presented. The degree of completeness of the initial information available in planning rigidity diaphragms for multistory buildings determines the selection of the calculation model. When the information is quite incomplete, highly simplified calculation models should be used. Tables 4; Figures 2; References 9 Russian.

USSR

UDC 624.074-415:693.547

#### CONCRETING OF THINWALL, DENSELY REINFORCED SHELLS BY PNEUMATIC SPRAYING

Moscow BETON I ZHELEZOBETON in Russian, No 11, Nov 77, pp 28-29

SHAVRIN, V. I., Scientific Research Institute of the Construction Industry, SABALDYR', V. P., Kiev City Construction Trust, CHERNETSKII, B. G., Scientific Research Institute of the Construction Industry, and MARTYNENKO, L.S., State Scientific Research Institute for Road Construction

[Abstract] Kiev City Construction Trust No. 4 has used the method of pneumatic spraying to concrete shells. Each shell is a densely reinforced structure of compound curvature with wall thickness varying from 300mm at the base to 150mm at the top, maximum span 21m, height at center 19.5m. The reinforcement is in two rows, parallel to the horizontal and vertical generatrices of the shell, using rods 16 and 12mm in diameter with spacings of 60x60 to 150x150mm. The concrete used is strength grade M400, cold-resistance grade 150. The concrete mix was applied at 0.8-1.2m<sup>3</sup>/hr, although the SB-67 concrete spraying machine was deliver up to 2.25m<sup>3</sup>/hr. The low efficiency of the operation resulted primarily from organizational factors, which were improved as experience was gained. Problems included the long time required to load the machine with dry mixture, the need to move hoses from one level of the scaffold to another, extensive work required to clean the deck after spraying, etc. In spite of these problems, the method is economically effective, reducing the cost of laying 1m<sup>3</sup> of concrete mix by 6.64 rubels in comparison to pouring into double wooden forms and decreasing labor by 0.785 man-days per m<sup>3</sup>.

## STRENGTH AND DEFORMATION OF ROD REINFORCEMENT UPON HIGH-SPEED IMPACT LOADING

Moscow BETON I ZHELEZOBETON in Russian, No 12, Dec 77, pp 21-24

RAKHMANOV, V. A., National Scientific Research Institute for Reinforced Concrete

[Abstract] Studies of the dynamic properties of reinforcement have led to very contradictory results. In this article, the American MTS-819 test system was used. Static and dynamic testing of specimens were performed at four fixed loading rates: 0.04, 0.4, 100 and 400mm/s. The tests were performed on reinforcement specimens 14-18mm in diameter with a gage length of 200mm, using reinforcement of classes A-I, A-II, A-III, At-III, At-V and At-VI. At-III reinforcement is made of heat treated St5 steel and At-VI is made of type 23KH2G2T steel. Deformation rate was found to influence the lower limit of yield point less than the upper limit of yield point. The sensitivity of the yield point of the hardened steels was less than that of unhardened steels, corresponding closely to the variations with speed recommended for class A-IV steel. The data produced lead to no particular conclusion concerning the influence of the strength properties of reinforcement on the development of dynamic deformations. For steels with a physical yield point, as deformation rate increases, there is an increase in the length of the flow area  $\lambda$ . An equation is presented for calculation of the dynamic properties of the types of reinforcement studied. Use of the Campbell criterion is not recommended. Figures 3: Table 1; References 4 Russian.

USSR

UDC 666.1.031.24

## AERODYNAMIC CHARACTERISTICS OF A FLAME UPON INJECTION OF GAS THROUGH THE SIDES OF A BURNER

Moscow STEKLO I KERAMIKA in Russian, No 40, Apr 78, pp 14-16

SHUTNIKOVA, L. P. and POPOV, O. P., Gusev affiliate of State Institute for Glass

[Abstract] The authors' institute has performed studies of the aerodynamic conditions of combustion of fuel in the burners of regenerative glass furnaces of varying designs. For this purpose, model burners of organic glass were constructed in 1:10 scale. The modeling agent used was compressed air, delivered at a rate providing self-similarity. The nature of movement of the gases in the flame with fuel input through the side wall of the burner was studied. The influence of collision of the jets and their angle to the mass of glass was studied. An optimal furnace width was found for combustion of a fan-shaped flame. Wide, flat flames deliver the greatest quantity of heat to the glass. Figures 3.

USSR

UDC 532.72

## DIFFUSION INTERACTION OF DROPS IN A LIQUID

Moscow IZVESTIYA AKADEMII NAUK SSSR: MEKHANIKA ZHIDKOSTI I GAZA in Russian No 2, Mar/Apr 78 pp 44-56 manuscript received 25 Mar 77

POLYANIN, A. D., Moscow

[Abstract] The three-dimensional problem of steady-state convective diffusion toward the surfaces of liquid particles is considered for a chain of droplets in a laminar flow of viscous incompressible fluid. It is assumed that a unique normal can be drawn at any point of the surface of each drop, and that there is a region where these normals do not intersect. The velocity distribution of the laminar flow is known from solution of the corresponding hydrodynamic problem. The analysis is based on spliced asymptotic expansions with increasing Peclet number. It is shown that close to the chain when the stream function of the problem  $\psi \approx \sqrt{D/\epsilon} \cdot \dots$  (where  $D$  is the coefficient of diffusion,  $\epsilon$  is the characteristic dimension of the droplets,  $U$  is the characteristic velocity of the oncoming flow), the concentration of the material dissolved in the flow is almost the same as the undiluted concentration in the oncoming flow. Therefore if there are many droplets and the distance between them is much greater than  $\epsilon$ , they have no mutual diffusion influence. Analysis shows that in concentrated dispersed systems a decisive part in heat and mass exchange between phases

is played by the structure of stream lines that originate or terminate on the surface of a droplet. A solution is found for the diffusion problem in the case where there are critical lines on the surface of a droplet. The results can be generalized to inviscid or filtration flow around particles. The author thanks Yu. P. Gupalo and Yu. S. Ryazantsev for interest in the work. Figures 4, references 11: 8 Russian, 3 Western.



USSR

STUDY OF THE DYNAMICS OF DIAMOND GRINDING OF FERRITES

Minsk IZVESTIYA AN SSR, SERIYA FIZIKO-TEKHNICHESKIKH NAUK in Russian, No 4, 1977, pp 55-59, manuscript received 30 Nov 76

YASHCHERITSYN, P. I., ZAITSEV, A. G., STAROV, V. N., Voronezh Polytechnical Institute

[Abstract] A study is made of the forces developing during rough grinding of ferrites, and equations are developed for the components of the cutting force of hot-pressed ferrites as a function of the grinding mode, grain size and treatment conditions. As cutting speed, feed, depth and grain size increase, cutting forces increase significantly. Analysis shows that efficient modes for rough grinding of hot-pressed NiZn ferrites are as follows:  $V_d = 25-35/s$ ,  $S_f = 0.5-1.5m/min$ , cutting depth  $t = 0.06-0.04mm/double$  stroke, grain size of diamond discs 50/50-80/63; cooling is obligatory. Figures 2; Tables 2; References 4 Russian.

USSR

IDENTITY OF FERROMODULATION TRANSDUCERS IN MULTICHANNEL MAGNETIC MEASUREMENT SYSTEMS

Moscow METROLOGIYA in Russian, No 2, 1978, pp 68-72

ZAYTSEV, A. V., RUDINA, N. M., IPATOVA, Z. I.

[Abstract] Modern multichannel magnetic measurement systems are frequently equipped with hundreds of ferromodulation transducers, which must be very nearly identical. The requirement for identity of transducers and possible means of satisfying it are analyzed. A technology is suggested for manufacturing windings which can achieve a reproducibility of constants 30-40 times better than windings made by the old technology. The new windings are made with flat turns by a technology based on electrochemical deposition of a conducting nonmagnetic layer onto a thermally stable frame and subsequent mechanical working of this layer to produce the winding. Table 1; References 3 Russian.

USSR

UDC 532.5

ON CALCULATING THE CHARACTERISTICS OF A VIBRATION SOURCE LOCATED IN A LIQUID LAYER

Moscow IZVESTIYA AKADEMII NAUK SSSR: MEKHANIKA ZHIDKOSTI I GAZA in Russian No 2, Mar/Apr 78 pp 3-8 manuscript received 11 Jul 77

TKACHEV, G. V., Rostov-na-Donu

[Abstract] The author considers the axisymmetric problem of excitation of steady-state oscillations of a layer of ideal incompressible fluid in a gravitational force field by vibration of two circular plates fastened around the edges and immersed to a certain depth in the liquid. The layer of liquid with upper boundary free from stresses is located on an absolutely rigid base. The boundary value problem is formulated in terms of solution of the Laplace equation for the velocity potential, and is reduced to solution of an integral equation of the first kind. It is assumed that the velocities of the vibrating plates are known. A technique involving factorization of functions is used to reduce the problem to a Fredholm's equation of the second kind that is numerically solved on a digital computer, giving the amplitude function of the potential difference for various frequencies and depths of the vibration source. The results show the distribution of the complex potential difference along the radius of the source. The apparent additional mass of the source is determined. The results can be used to calculate and optimize the parameters of marine vibration seismic sources. The author thanks V. A. Babeshko for interest in the work and constructive criticism. Figures 2, references 8 Russian.

USSR

UDC 666.11.01:537.311.32

GLASS-CRYSTALLINE MATERIALS IN THE SYSTEM  $\text{RO-Al}_2\text{O}_3\text{-SiO}_2\text{-TiO}_2$  WITH ELEVATED CONDUCTIVITY

Moscow STEKLO I KERAMIKA in Russian, No 3, Mar 78, pp 17-19

SIL'VESTROVICH, S. I. and SEMENOVA, YE. V., Moscow Institute of Chemical Technology imeni D. I. Mendeleev

[Abstract] If the ability of titanium to catalyze directed crystallization and stimulate electron conductivity is actualized in silicate glasses, materials can be synthesized in which high thermomechanical properties are combined with high conductivity. This article presents a study of the nature of the change of conductivity of glasses with a tendency toward body crystallization as a function of the composition of the initial glass, development of body crystallization, phase composition of the products produced, and the influence of various oxides of titanium. It is found that the logarithm of the volumetric resistivity of the glasses studied is a linear function of the reciprocal of temperature. The study further indicates that modification of the composition of the glasses selected can alter their resistivity by no more than two orders of magnitude, whereas crystallization can lead to greater changes in resistivity. Thus, to create a glass crystalline material with the minimum resistivity, it is necessary first of all to achieve the optimal degree of crystallization of the glass. The degree of reduction of titanium is also used to influence resistivity significantly. Figures 4; References 8 Russian.

USSR

UDC 666.762:620.191

SOME ASPECTS OF THE MECHANISM OF CORROSION OF ELECTRICALLY FUSED CHROME-ALUMINUM-ZIRCONIUM REFRACTORIES

Moscow STEKLO I KERAMIKA in Russian, No 3, Mar 78, pp 8-10

FEDOROVA, R. A., BONDARYEV, K. T., SHVORNEVA, L. I. and FROLOVA, V. P., State Institute for Glass

[Abstract] The glass-corrosion resistance of chromium-aluminum-zirconium refractories has been found to vary complexly as function of the composition and structural peculiarities of the materials. A group of refractories containing an identical quantity of vitreous phase with various concentrations of  $\text{Cr}_2\text{O}_3$  in the crystals of the  $(\text{Cr, Al})_2\text{O}_3$  solid solution is studied. The specimens were studied after being tested for glass corrosion resistance in the static mode at 1500 C for 24 hr in a melt of sodium-calcium silicate glass. The results of the study showed that at high temperatures, there is interaction of the glass mass with the crystalline

phase of the refractory. The most promising materials from the standpoint of glass corrosion resistance and technology are those with the following compositions: 23.43  $\text{Cr}_2\text{O}_3$ ; 56.22  $\text{Al}_2\text{O}_3$ ; 13.83  $\text{ZrO}_2$ ; 6.25  $\text{SiO}_2$ ; 0.28  $\text{Na}_2\text{O}$ ; 33.91  $\text{Cr}_2\text{O}_3$ ; 45.31  $\text{Al}_2\text{O}_3$ ; 13.71  $\text{ZrO}_2$ ; 6.57  $\text{SiO}_2$ ; 0.50  $\text{Na}_2\text{O}$ . Figures 4; Tables 2; References 3 Russian.

USSR

UDC 620.179.14

# ELECTROMAGNETIC HARDNESS TESTING OF HEAT TREATED MINIATURE PRODUCT SPECIMENS OF 40Kh STEEL

Sverdlovsk DEFEKTOSKOPIYA in Russian, No 3, Mar 78 pp 62-68 manuscript received, after revision, 11 Aug 77

MIKHEYEV, M. N., GORKUNOV, E. S., GREBENSHCHIKOV, V. V., REMEX, N. V., and SHCHETKOVA, M. P.

Institute of Metal Physics, Ural Science Center of the USSR Academy of Sciences  
Ural Heavy Machinery Plant imeni S. Ordzhonikidze

[Abstract] A study was made to establish a correlation between the changes in the electromagnetic properties and hardness of grade 40Kh medium-carbon steel that are due to changes in the heat treatment. The absolute power loss per magnetization reversal cycle and the relative power loss, comparative to that in a standard reference specimen, served as the control parameters and were measured by the wattmeter method with a dual-purpose circuit including also a current transformer as well as an ammeter and two different voltmeters. The hardness was measured with a Rockwell C tester. Miniature cylindrical specimens from five different ladles, 5 mm in diameter and 35 mm long, were quenched and then tempered at temperatures for 150 to 600°C. With the appropriate reference specimens, at each amplitude of magnetic induction during a partial hysteresis cycle the relative (difference) power loss was found to be a single-valued function of the tempering temperature over a different range. Accordingly, a weak magnetic field ( $B=0.05\text{T}$ ) is best suited for quality control of grade 40Kh steel heat treated within the 400-560°C range by the power loss method. Relative measurements improve the resolving power of such an inspection, while absolute measurements prevent acceptance of defective miniature parts. This method is 2-2.5 times more economical than inspection by Rockwell C hardness testing. Figures 5; Tables 1; References 11 Russian.

USSR

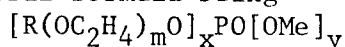
UDC 661.185:66.063.612

# AN AGENT FOR REMOVING PETROLEUM AND PETROLEUM PRODUCTS FROM THE WATER SURFACE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI in Russian, No 14, 15 Apr 78 Authors Certificate No 602214 6 Jun 73

ABAYEV, T.V., ANTONOVA, N. M., LUKMANOV, YU.KH., MOCHALOVA, O. S., NEMIROV-SKAYA, I. A., NESTEROVA, M. P., PELEVIN, L.A., POZINYSHEV, G. N., SMIRNOV, YU. S., and RAUBMAN, A. B., Institute of Oceanology imeni P. P. Shirshov

[Text] 1. An agent based on water and a surfactant, with the distinguishing feature that, for a better dispersing and stabilizing effect, it contains as the surfactant an acidic salt of phosphoric ether and an oxyethylized higher-order alcohol, the general formula being



where R denotes an alkyl with at least seven carbon atoms,

Me denotes an alkali metal,

$$m \geq 8,$$

$$x+y=3,$$

and added to it a water-soluble polymer to make the overall composition of the agent, in wt.%,

acidic salt of phosphoric ether and oxyethylized higher-order alcohol	30-60%
water-soluble polymer	0.2-2%
water	remainder

2. The same as 1., except that casein or gelatin is used as the water-soluble polymer.

USSR

UDC 621.313.333-213.34:622.232

# THE DESIRABILITY OF REPLACING ALUMINUM SQUIRREL CAGES WITH COPPER

Moscow PROMYSHLENNAYA ENERGETIKA in Russian, No 2, Feb 78, pp 35-38

VOLOSHCHENKO, N. I., USSR Coal Industry Ministry, KIKLEVICH, N. A., CHUVASHEV, V. A., Donetsk Polytechnical Institute

[Abstract] Analysis of failure rates in electric motors shows that some 30% of the failures of induction motors in mines result from failure (melting) of case aluminum rotor windings. The melting point of copper is significantly higher than that of aluminum; therefore, replacement of aluminum

squirrel cages in these motors with copper ones would eliminate the problem of melting. Copper windings also increase motor torque and efficiency in the 1140 V power systems used in mines. If the amount of copper used per motor is increased, the output of one mining machine can be also increased, thus reducing the total consumption of copper in the entire mining system consisting of the power transformer, cable and electric motor. Figures 2; Tables 2; References 3 Russian.

USSR

UDC 666.3.015

INFLUENCE OF CHALK ON THE FORMATION OF CRYSTALLINE PHASES FROM CLAY MINERALS AND POLYMINERAL CLAYS

Moscow STEKLO I KERAMIKA in Russian, No 4, Apr 78, pp 23-25

MOROZ, B. I., Scientific Research Institute for Building Materials and Products

[Abstract] A study was made of the possibility of producing facing tiles using various clays, all acid polymineral, nonsintering clays containing significant quantities of quartz and calcite. Specimens were prepared by pressing and roasted for 30-40 minutes at a maximum temperature of 1060C. The authors found that the introduction of chalk to the mass did not greatly increase water absorption or porosity, but greatly increased the strength, which had been unsatisfactory with the clays alone. Experimental batches of the tiles have been produced at "Keramik" Plant, using high-speed drying and roasting at 1040-1060C, then at 920-940C for 35-45 minutes, and have shown satisfactory strength. Figures 4; Tables 4.

USSR

UDC 666.1.056

PROPERTIES OF THIN LAYERS OF TITANIUM, NIOBIUM AND ZIRCONIUM OXIDE MIXTURES PRODUCED BY CATHODE SPUTTERING

Leningrad OPTIKO-MEKHANICHESKAYA PROMYSHLENNOST' in Russian No 3, Mar 78 pp 47-49 manuscript received 28 Sep 76

MOTOVILOV, O. A., candidate of sciences (deceased), RUDINA, O. G. and TUROVSKAYA, T. S.

[Abstract] Experimental studies are done on the optical properties structure of thin layers of  $TiO_2-Nb_2O_5$ ,  $TiO_2-ZrO_2$  and  $Nb_2O_5-ZrO_2$  made by cathode

sputtering on glass substrates. The indices of refraction were determined from the spectral characteristics of transmission or reflection with respect to interference extrema. The index of refraction for each system was intermediate between those of the separate oxides, but did not conform to additive laws. The light diffusing property of the various oxide systems was not a monotonic function of composition. The curves for light diffusion as a function of composition show extrema corresponding to complex oxides. The results seem to indicate that the high index of refraction of oxide layers is incompatible with low diffusion of light. For an index of refraction of 2.4-2.3, the light diffusion amounts to hundredths, and frequently even tenths of a percent. In addition, production of multilayered coatings of this kind requires at least three cathodes in the sputtering chamber. Figures 3, Referenced 3 Russian.

USSR

UDC 621.923:[621.9.079:621.892].001.4

#### TESTING OF NEW CUTTING FLUIDS FOR HIGH-SPEED GRINDING OF METALS

Moscow VESTNIK MASHINOSTROYENIYA in Russian, No 4, Apr 78, pp 52-54

YEGOROV, N. I., VOLKOV, M. P., SAVIN, I. G.

[Abstract] Comparative tests were conducted of a number of new water- and oil-based cutting fluids. Laboratory testing was performed by a rapid method, involving grinding of specimens at 25-100m/s and allowing rapid determination of the technological properties of the cutting fluids with relatively low fluid consumption (10-15 ). Under severe, high-speed grinding conditions, the new aqueous emulsions are more effective than the oil-based liquids and allow grinding of various metals with greater specific loads. Effectiveness increases with increasing emulsion concentration. The best of the new fluids are similar to simperial-20 in composition and properties. Figures 2; Table 1; References 2 Russian.

USSR

UDC 53.087.92.001.5:537.533.3

OPTIMIZATION OF THE PARAMETERS OF AN OPTICAL-ELECTRONIC INSTRUMENT FOR THE MEASUREMENT OF THE CONCENTRATION OF ELECTROLYTES

Moscow IZMERITEL'NAYA TEKHNIKA in Russian, No 12, Dec 77, pp 52-53

GRAMOLINA, N. O., KOMAROV, YU. A., MUCHNIK, G. F.

[Abstract] An optical-electronic instrument has been developed for measurement of the concentration of electrolyte solutions, using a source of radiation with a diverging light beam, for studies in a broad range of concentrations with constant sensitivity, and a parallel light beam, for operation as a threshold transducer. The characteristics of the sensing element with the diverging and parallel beams are compared by analyzing the attenuation of the light beam only due to reflection at the boundary of the side surface of the rod and the medium being studied, ignoring losses resulting from reflection at the ends and absorption by the material of the rod. It is found that in order for the instrument to operate in the area of maximum sensitivity, the incident angle of the light beam must be near the angle of total internal reflection, corresponding to the minimum of the index of refraction of the medium being studied. Use of a laser light source with a diverging light beam allows studies to be performed over a broad range of concentration. Instruments of this type can be used for continuous measurement and testing of the concentration of solutions. Figures 2; Reference 1 Russian.

USSR

UDC 539.143.43

A METHOD OF DETERMINING THE POROSITY OF ROCKS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYEE OBRAZTSY TOVARNYYE ZNAKI in Russian, No 13, 5 Apr 78 Author's Certificate No 601606 8 Dec 76

BELORAY, YA. L., ZAPOROZHETS, V. M., NERETIN, V. D., PETROSYAN, L. G., SHIMELEVICH, YU. S., and YUDIN, V. A., All-Union Scientific Research Institute of Nuclear Geophysics and Geochemistry

[Text] Application of the nuclear-magnetic-resonance method, involving placement of the test sample into a measuring test tube inside the transducer of an NMR relaxometer and subsequent measurement of an NMR signal emitted by the test sample, with the distinguishing feature that, for a more precise determination, the test tube is filled with a liquid containing hydrogen and the amplitude  $A_r$  of an NMR signal from this reference liquid is measured, whereupon the test sample is dropped into the test tube with this liquid and the amplitude  $A_1$  of an NMR signal from the interstitial residue of the hydrogen-containing liquid and from the liquid in the pores is



measured, then the hydrogen-containing liquid in the interstitial space is replaced by specimens of heavier and more viscous liquid not containing hydrogen nuclei, the amplitude  $A_2$  of an NMR signal from this liquid in the pores of the test sample is measured, the porosity  $K$  of the given rocks being calculated from all these data according to the formula

$$K = \frac{A_2}{A_r - A_1 + A_2}$$

USSR

UDC 513.7:519.2

# THE PRECISION OF DIGITAL ANGLE TRANSDUCERS WITH BIMODAL INSTRUMENTAL ERROR PROBABILITY DISTRIBUTION

Moscow METROLOGIYA in Russian, No 2, 1978, pp 3-9

DOMRACHEV, B. G., MEYKO, B. S.

[Abstract] An analysis is presented of the accuracy capabilities of digital angle transducers with bimodal error probability distributions, considering the great generality of such cases. It is found that in the structural aspect, the error consists of both constant and variable components, either of which may be systematic or random. The statistical structure of the constant, random component is formed in the design stage of the hardware as a result of the tolerances used, while the variable components of both systematic and random error are determined in the manufacturing stage as functions of the measured quantities. The probability distributions of the components of error form a series of probability distributions, elongated in the region of modal ordinates. Computer calculations show that this reduces the accuracy of the code generated by the hardware to 40-50%. The maximum possible accuracy is 75-90%. The decrease in accuracy occurs gradually as the exponents of sections of the parabolas illustrating the variation of code reliability for various types of hardware increase. The maximum accuracy is achieved by hardware operating in the forced readout mode, the minimum reliability--by hardware using binary cyclical coding. Figures 3; Table 1; References 4 Russian.

USSR

UDC 621.375.726.089.6

STUDY OF THE MODULATION CHARACTERISTICS OF AN Ne-Ne LASER OPERATING AT  
VARIOUS WAVELENGTHS

Moscow METROLOGIYA in Russian, No 2, 1978, pp 41-43

AKCHURIN, G. G.

[Abstract] In order to determine the basic physical processes allowing fluctuations in the visible and infrared radiation lines of He-Ne lasers, the discharge current was externally modulated in the 30 Hz-300 kHz frequency band. Equations are given which define the modulation of intensity for the three basic operating modes of the laser. The "threshold" effect discussed in earlier works was not detected, probably because of the low level of modulation of the intensity of the infrared line in the present work. Tables 2; References 5 Russian.

USSR

UDC 620.179.16.088

MEASUREMENT ERRORS OF THE USM-3 ULTRASONIC DEFECTOSCOPE

Moscow IZMERITEL'NAYA TEKHNKA in Russian, No 10, Oct 77, pp 30-31

ROMANKO, A. A.

[Abstract] The boundaries of application of a method of measurement of the depth of defects or the thickness of products based on preliminary adjustment of the depth-measuring device using a specimen of the same material, within which an error of not over  $\pm 2\%$  of the full scale of the instrument can be achieved, are determined. The depth-measuring attachment to the UDM-3 defectoscope is used. It is found that when there is additional delay of the signal within the instrument and associated attachments, the error may exceed the set limit. This error can be reduced by using specimens for adjustment of the instrument as close as possible in thickness to the specimens on which measurements will be actually made. At least two echo signals must appear on the CRT screen of the defectoscope, both in adjustment and in measurement, in order to eliminate the error introduced by signal delay in the circuits of the instrument. Figure 1; Reference 1 Russian.

USSR

UDC 622.945.002.4:532.001.5

LOWERING THE HYDRAULIC DRAG IN DRILL STEM AND ANNULUS

Tashkent IZVESTIYA AN UZ SSR, SERIYA TEKHNIЧЕСКИХ НАУК in Russian No 6,  
Jun 77 pp 60-62, manuscript received 3 Mar 77

MAKHMUDOV, S. Z., AFONIN, G. I., and MAMIROV, T. M., Institute of Geology  
and Exploration of Oil and Gas Deposits

[Abstract] A study was made of means of reducing the mud-induced hydraulic drag inside and outside the drill stem by adding asphalt tar. The reduction of the pressure losses, the optimal additive concentration and the effect of the asphalt on the physical-mechanical properties of the drilling mud and the rock in the walls of the well were investigated. The addition of asphalt lowers the hydraulic drag but it has little effect on the rheological properties of the drilling mud.

In the described tests, the pump pressure dropped 15 to 17 percent, the double piston strokes increased by 15 to 17 percent, water losses were reduced, and the condition of the well was improved. The drilling mud used had a specific weight of 1.20 grams/cm<sup>3</sup>, a viscosity of 40 seconds and a pH of 8 to 9.

USSR

UDC 535.853-1:243.2.083

CALIBRATION OF THE PHOTOMETRIC SCALE OF A SPECTROPHOTOMETER BY MEANS OF THE TRANSMISSION SPECTRUM OF FLUORITE IN THE 800-12-0  $\text{cm}^{-1}$  RANGE

Leningrad OPTIKO-MEKHANICHESKAYA PROMYSHLENNOST' in Russian, No 1, Jan 78, pp 5-7, manuscript received 25 Mar 77

VOROB'YEV, V. G., ARKATOVA, T. G., MIKHAYLOV, B. A.

[Abstract] A study is made of the possibility of using the transmission spectrum of fluorite in the 800-1200  $\text{cm}^{-1}$  range to calibrate the photometric scale of spectrophotometers. Earlier works assumed that the logarithm of the absorption factor of fluorite changed linearly with a change in wave number. However, analysis of the optical constants of fluorite and the measurements of the authors have shown that this is true only over a limited transmission interval. The deviation from linearity for a specimen of fluorite 4 mm thick averages  $\pm 0.003$  in the transmission interval  $0 < T < 1$ . The authors therefore attempted to use specimens of fluorite to calibrate the photometric scale of spectral instruments by changing the thickness of the fluorite specimens. This allows determination of the values of transmission of the fluorite by calculation. This study showed that the use of optical materials such as fluorite as means for reproduction of transmission in order to develop continuous photometric scale calibrators for spectrophotometers is quite promising. Figures 3; Tables 3; References 5: 2 Russian, 3 Western.

USSR

UDC 621.383

INFLUENCE THAT ERRORS IN DETERMINING BACKGROUND SPACE CHARACTERISTICS HAVE ON THE ACCURACY OF CALCULATING THE THRESHOLD SENSITIVITY OF AN OPTOELECTRONIC SYSTEM

Leningrad OPTIKO-MEKHANICHESKAYA PROMYSHLENNOST' in Russian No 3, Mar 78 pp 3-5 manuscript received 9 Jun 77

CHUBAKOV, L. G., SHUBA, YU. A., candidate of sciences, and YATSYK, V. S.

[Abstract] An analysis is made of the influence that relative errors in determining a number of parameters of background space characteristics have on the accuracy of calculation of the threshold illuminance of a photoelectric indicator with pulse modulation comprised of a lens, radiation sensor and electric filter. A simple relation is derived that related the experimental errors of background measurements to design errors in the planned optoelectronic system. It is shown that within the limits of the parameters of present optoelectronic systems the error in determining the threshold

illuminance is no more than 40% of the error in determining background parameters. The accuracy requirements in determination of background parameters are predetermined by equipment parameters. These requirements are relaxed when the equipment is to be used in a background environment with low value of the parameter  $z=D/r$ , where  $D$  is the dispersion of the background brightness, is a parameter that characterizes the angular dimensions of the sensitive spot on the radiation pickup, and  $r$  is the correlation coefficient. This condition is met by a variegated background with low intensity of differentials, or by a high-intensity uniform background with small fluctuations. References 3: 2 Russian, 1 Western.

USSR

UDC 539.216.22:535

# PROTECTION OF OPTICAL PARTS MADE OF TYPE GLASS WITH A THIN FILM OF TANTALUM PENTOXIDE

Leningrad OPTIKO-MEKHANICHESKAYA PROMYSHLENNOST' in Russian, No 1, Jan 78, pp 26-27, manuscript received 21 Dec 76

PERVEYEV, A. F., CHEREZOVA, L. A., MIKHAILOV, A. V.

[Abstract] A method is described for protection of type OF glass by application of a thin film of  $Ta_2O_5$ . This film has high mechanical strength and chemical stability, so that if it is monolithic and good adhesion is achieved, it can protect the glass from cracking and codensation. The film is applied in a vacuum by reactive HF atomization of a target of type TVCh sheet tantalum in a magnetic field in an oxygen medium. Figure 1; References 4 Russian.

USSR

UDC 624.072.22.014.2.044:539.376:681.3

INFLUENCE OF CREEP OF STEEL ON THE DEFORMATION OF BENDING ELEMENTS UNDER MOVING LOADS

Moscow STROITEL'NAYA MEKHANIKA I RASCHET SOORUZHENIY in Russian, No 1, 1978, pp 24-27

CHERNOV, N. L., Odessa Construction Engineering Institute

[Abstract] A study is made of the stress-strain state of single-span, freely resting beams under the influence of the sequential passage of concentrated forces at various speeds. The beam is considered to be a symmetrical I-beam, and the speed of passage of each individual load over the beam is constant. The results of experimental study of the increasing bending of beams under these conditions differ qualitatively from the predictions of the theory of small elastic-plastic deformations. This article explains this divergency by introducing the phenomenon of creep of the steel at low temperatures. Since the steel does not have ideal continual properties, plastic deformations develop in it discreetly in the form of slip planes at the level of groups of crystallites. This leads to eventual stoppage of the creep at the edges of creep zones and full stabilization of bending, agreeing with results of machine calculation. Figures 3; References 6 Russian.

USSR

UDC 624.07.2.2.04

THE ANALOGY BETWEEN TWISTING OF THINWALL AND BENDING OF COMPOSITE RODS AND ROD SYSTEMS

Moscow STROITEL'NAYA MEKHANIKA I RASCHET SOORUZHENIY in Russian, No 1, 1978, pp 19-24

DROZDOV, P. F., Moscow Construction Engineering Institute

[Abstract] Earlier works have shown that the equations for the twisting of a thinwall rod are mathematically similar to the equations for bending of a composite rod. The analogy allows the design of certain rods (systems) to be replaced by calculation design of others, for which standard solutions are available for various particular cases. An example is presented. They also illustrate certain common specifics in the behavior of rods and their systems and allow these specifics to be interpreted physically. Figures 5; Tables 2; References 6 Russian.

USSR

UDC 620.194.001.5

LOW-CYCLE CORROSION FATIGUE OF PIPE STEEL DURING THE USE OF MAIN OIL  
PIPELINES

Moscow STROITEL'STVO TRUBOPROVODOV in Russian, No 4, Apr 78, pp 27-29

GUTMAN, E. M., AMOSOV, B. V., KHUDYAKOV, M. A., Institute of Petroleum,  
Ufa

[Abstract] A study of failures of pipes in main oil pipelines has shown that the most common type of rupture is a longitudinal failure, not necessarily occurring at the welded seam, frequently extending across butt welds between two pipe sections, but always beginning at some stress concentrator, either the welded seam or a scratch or other defect in the pipe. Plastic deformation does not occur at the point where the failure begins, the plane of failure is perpendicular to the surface of the pipe, and the failure zone is parallel to the axis of the pipe. The nature of the failure in the zone where the crack starts, with no embrittlement or significant plastic deformation, indicates that the failure is a fatigue failure resulting from variable cyclical loadings. Pipeline steel specimens were tested for low-cycle fatigue failure in contact with corrosive and surface-active agents such as those carried through the pipes, and with stress concentrators such as scratches, and it was found that the fatigue strength of the specimens was significantly lower than the standard fatigue strength for the metals without corrosive and surface-active agents or stress concentrators. Figures 4.

CZECHOSLOVAKIA/USSR

UDC 621.791.4/.8.053:620.169.1

TRUFJAKOV, V. I.; GUSCA, O. I.; TROCENKO, V. P.

CHANGES OF RESIDUAL STRESSES IN CONCENTRATION ZONES OF PARTS EXPOSED TO  
CYCLICAL LOADS

Prague STROJIRENSTVI in Czech Vol 27 No 11, Nov 77 pp 681-684

[Abstract] Experimental determination of the life of welded joints is difficult because it requires models of a large size shaped to reproduce the analyzed item. This is needed so that the residual stresses remain analogical. The authors developed a new method of determination of the life of welds using experimental results obtained on small flat samples. The method is based on the finding that the level of resulting residual stresses in the regions of concentration will become stabilized after a few loading cycles. The authors conducted their experiments using two samples 180 mm diameter

20 mm thick, and two samples 30 mm diameter 6 mm thick with an original residual stress of 25 kp/mm<sup>2</sup>. For the calculations of the stabilized residual stresses their level was assumed to be fixed after 10 loading cycles. The life of the weld was considered to be exhausted when fissures one to two mm deep appeared in the weld. The expected life calculated for the large samples was 60,000 cycles, for the corresponding small samples 58,000 cycles. Ultrasonic testing of the samples was used. Figures 7; Table 1; References 4, all USSR.



EQUIPMENT  
Acoustical & Ultrasonic

USSR

UDC 654.926

AN ACOUSTIC ALARM DEVICE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE SNAKI in  
Russian, No 16, 30 Apr 78 Author's Certificate No 605232 15 Jul 74

ZAKOMORNYI, G. V.

[Text] An alarm device including a generator of clocking pulses which has a controlling input and is connected to a decoder through a pulse counter, the latter also with a controlling input connecting to the first input of a trigger with two inputs, an audio oscillator whose output connects to a loudspeaker and to the input busbar for the start signal, with the distinguishing feature that, for simpler control of the alarm device, it is also furnished with a (parallel)code-to-voltage converter connected between the input of the audio oscillator and the decoder outputs, the decoder being connected to one input of a trigger whose other input connects to the input busbar for the start signal and other output connects to the controlling input of the generator of clocking pulses.

USSR

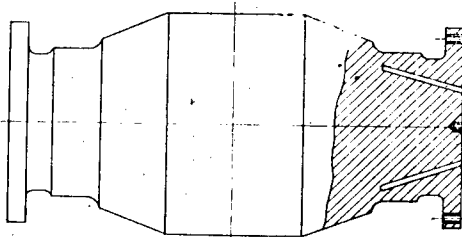
UDC 621.771.237

A ROLLER FOR METAL ROLLING WITH SUPERPOSITION OF ULTRASONIC VIBRATIONS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE SNAKI in  
Russian, No 9, 5 Mar 78 Author's Certificate No 596307 17 Jun 76

CHELYSHEV, N. A. and PROSKURIN, V. G., Siberian Metallurgical Institute  
imeni S. Ordzhonikidze

[Text] A roller consisting of a barrel, a neck with borings and stress risers, with the distinguishing feature that for a more effective utilization of ultrasonic vibrations, the borings are slanted at a  $14-37^\circ$  angle to the shaft axis, and they run as deep as from the shaft shoulder to the barrel chamber.



USSR

UDC 620.179.16

# AN ULTRASONIC DIGITAL DEFECTOSCOPE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOV ARNYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596878 7 Apr 75

SHOKOV, R. I. and TARASOV, M. G.

[Text] A defectoscope including a synchronizer connected to a generator of ultrasonic vibrations, to a sweep generator, to a discriminator of surface and bottom echo-signals, and to a signal dropping circuit, also a transceiver probe connected to the output of the ultrasonic generator and to the second input of the echo-signals discriminator, also an amplitude quantizing circuit whose first input connects to the output of the signal dropper, also a CRO connected to the output of the sweep generator and to the second input of the amplitude quantizer, also an intermittent sensitivity regulator connected between the output of the transceiver probe and the input of the echo-signals discriminator, with the distinguishing feature that, for a more reliable inspection, the intermittent sensitivity regulator comprises an amplifier with programmed gain variation consisting of n identical channels, each channel including a tuned amplifier, a limiter, and a splitter into P+1 outputs, all in series, and P groups of stages consisting of a detector, a video amplifier, and an intermittent selector, all in series, with the input of the first channel connecting to the transceiver probe and the input of the first channel connecting to the transceiver probe and the input of each following channel connecting to that splitter output in the preceding channel which connects to the detector inputs in each channel, also a summing network whose each input connects to one of the outputs of the corresponding intermittent selector and whose output connects to the inputs of the amplitude quantizer and of the CRO, also a generator of selecting pulses whose input connects to the echo-signals discriminator and whose outputs connect to the second inputs of the intermittent selector in each state.

USSR

UDC 620.179.16

## ULTRASONIC INSTRUMENTS FOR MEASURING THE THICKNESS OF PROJECT SAMPLES WITH ROUGH FINISHED AND CORRODED SURFACES

Sverdlovsk DEFEKTOSKOPIYA in Russian, No 3, Mar 78 pp 24-28 manuscript received, after revision, 17 Jan 77

KALININ, V. A., NUDEL'MAN, I. M., FIRSUKOV, A. A., and VOROSHILOVSKIY, YU. S.,  
All-Union Scientific Research Institute of Nondestructive Testing, Kishinev

[Abstract] The existing "Kvarts-6" ultrasonic echo-pulse caliper for inspection of pipes, boilers, ship sheaths, or other structures with rough surface

finish and subject to corrosion has been modified. The new variants "Kvarts-14" and "Kvarts-15" are suitable for wider ranges of ambient temperature (-30 to +50°C) and surface temperature (-30 to +600°C), they also have wider ranges of thickness measurement (1.2-99.9 mm and 1-300 mm respectively), and they are more compact. However, they draw more current from either the line or a separate power supply. Both instruments include sets of thickness reference gauges made of grade 45 steel, grade L-62 brass, and grade D16A aluminum alloy with plane-parallel surfaces as well as steel gauges with definite degrees of roughness, curvature radii, and nonparallelism. The instruments have passed certification tests and meet applicable standards, including explosion-proof features. They can detect a 4% reduction in thickness or a corrosion defect equivalent, in terms of acoustic reflectivity, to a flat-bottom hole 2.5 mm in diameter. The test frequency is 2.5 or 5.0 MHz. Figures 1; Tables 1; References 3 Russian.

USSR

UDC 620.179.16

#### AN INSTRUMENT FOR MEASURING THE VELOCITY OF ULTRASOUND IN MATERIALS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602791 16 Feb 76

NADEZH DIN, V. I. and KHEMELEVSKIY, V. I., Leningrad Institute of Aviation  
Instruments

[Text] An instrument including a generator of ultrasonic vibrations, a phase shifter, and a phase detector, all connected in series, also a transmitting transducer and a receiving transducer, the latter connected to an amplifier whose output connects to the input of the phase detector, with the distinguishing feature that, for extending the range and increasing the accuracy of measurements, it also includes a divider and modulator stage connected to the ultrasonic generator, and whose first output is connected to the transmitting transducer, the latter connected to the amplifier output, also an amplitude detector and a phase converter connected in series, also a summing circuit and a recording device, the second summator input being connected to the phase converter and its output connecting to one of the recorder inputs, also a voltage converter connected to the output of the phase detector, and also a circuit which put out the difference of codes, the output of the latter connecting to the second recorder input, while the output of the voltage converter connects to the input of the code differencing circuit and to the second summator input, and the second output of the divider and modulator stage is connected to the phase converter.

USSR

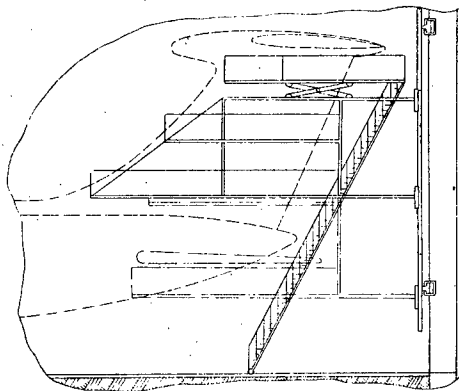
UDC 629.7.083

A DOCK FOR SERVICING AND REPAIRING THE TAIL FINS OF AN AIRCRAFT

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596502 23 Jul 76

SHIMANSKIY, V. A., GORYUNOV, A. D., VLASOVA, K. N., SIBURINA, L. N., and  
MITYAKOV, V. F., State Planning Surveying and Scientific Research Institute  
at the Central Office for the Surveying and Planning of Airlines and Airports

[Text] A dock including a support frame on which working platforms and a hoist platform have been mounted through bearing plates, with the distinguishing feature that, for more efficient maintenance and repair of various types of aircraft, the support frame is furnished with sets of feed and guide rollers which facilitate mounting it in the vertical position on guide rails horizontally installed along a hangar wall, while the bearing plates are furnished with adjusting elements so that they can be securely positioned at given levels relative to the support frame.



USSR

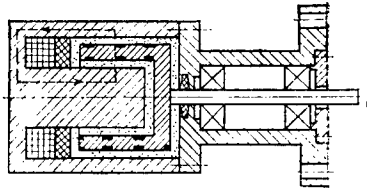
UDC 621.839.8

# AN ELECTROMAGNETIC POWDER-METAL BRAKE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596759 1 Jun 76

ZARIPOV, M. F., KHAYRYLLIN, I. KH., POTAPCHUK, N. K., and ISMAGILOV, SH. G.,  
Ufa Aviation Institute imeni S. Ordzhonikidze

[Text] A brake including a magnetic core with an annular main cavity filled with iron powder, an excitation coil wound around the magnetic core, and a cup rotor fitting into the cavity, this rotor having annular grooves around both the inside and the outside cup surface, with the distinguishing feature that, for a more reliable performance, those annular grooves are skewed relative to the rotor axis and filled with a nonmagnetic material.



USSR

UDC 681.327.6

# A FERROACOUSTIC INFORMATION COMPILER

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 597003 21 Oct 75

YESIKOV, B. S., PETROVSKIY, B. S., and PETROVYKH, S. V., Leningrad Institute  
of Aviation Instruments

[Text] A compiler containing groups of main sound conductors made of a magnetostrictive material, along which ultrasonic vibration transducers are spaced, a sampling circuit to which these transducers are connected, electrical conductors connected to a recording instrument and to a counter, and dampers inside which the main sound conductor are securely mounted, with the distinguishing feature that, for faster compiling, it also includes each group auxiliary sound conductors made of a magnetostrictive material and securely mounted inside the dampers parallel to the main sound conductors, while the sound conductors in each group have holes through which the electrical conductors pass.

USSR

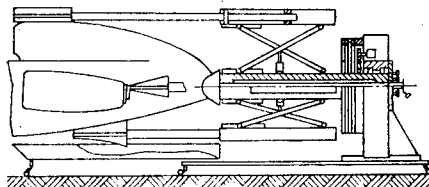
UDC 629.7.083.02

# A TOOL FOR CLEANING THE OUTER SURFACE OF OBJECTS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596501 26 Apr 76

TOCHENOV, L. A. and ORLOV, L. A., State Scientific Research Institute of  
Aviation Equipment Operation and Repair for Civil Aviation

[Text] A tool for cleaning the outer surface, particularly the exterior of airplanes, consisting of a trolley and on it a support plate on which are mounted hydraulically driven hoist mechanisms carrying power cylinders with brushes, with the distinguishing feature that, for higher efficiency, the hydraulically driven hoists are standing on a cantilever beam fastened to the support plate and furnished with a centering element at the free end, while the hydraulic hoist drives are coupled to a servomechanism comprising a set of distributor slide valves and pantographs engaged with them, all installed concentrically on the cantilever beam.



USSR

UDC 621.981.21

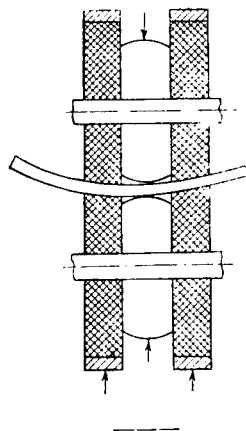
# A TOOL FOR FLATTENING OF SKIN

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, Mar 78 Author's Certificate No 596327 6 Feb 76

YERSHOV, V. I. and MARKEYEV, M. A., Moscow Institute of Aviation Technology  
imeni K. E. Tsiolkovskiy

[Text] A tool including profiled rollers with a rotary drive and an elastic element, with the distinguishing feature that, for broadening the scope

of technological applications, the elastic element consists of additional rollers on both sides of the profiled flattening rollers, made of an elastic material, and movable in the radial direction.



USSR

UDC 681.335.5

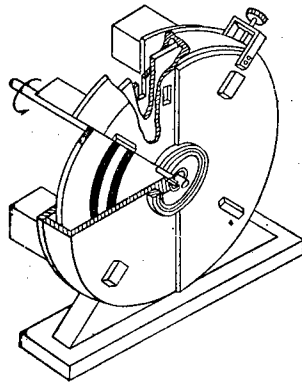
# A MULTICHANNEL DEVICE FOR MULTIPLYING ELECTRIC SIGNALS INTO HARMONICS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 13, 5 Apr 78 Author's Certificate No 601717 3 Jan 74

LUKASHENOK, A. B., TYUNIN, N. N., and KOTOLEVSKIY, YU. M. Red-Banner Riga  
Institute of Civil Aviation Engineers imeni Lenin's Komsomol State Scientific  
Research Institute of Civil Aviation, Central Office for Surveying and  
Planning of Airlines and Airports

[Text] A device including a modulator in the form of a cylindrical case with a translucent modulating disk mounted inside on a shaft, and around this disk concentrically mounted opaque templets of continuous harmonic relations, also lamps mounted around a circle  $\frac{\pi}{2}$  radians apart and optically coupled through the translucent modulator disk to corresponding converters, the latter including photoresistors connected into adjacent arms pairwise to the common diagonal of multiplying differential photoresistor bridges, their common diagonal constituting the corresponding signal input stage, while the other diagonals constitute respectively the sine output and the cosine output of the device, with the distinguishing feature that, for faster tuning, it also includes two shutters in the form of half-disks hinged to the shaft on both sides of the case and held together by a

bracket with a clamp, while two lamps are mounted on one of them around a circular arc at  $\frac{\pi}{2}$  angle and the corresponding converters optically coupled to them are mounted on the opposite one.



USSR

UDC 681.333

#### A DEVICE FOR SIMULATING AEROELASTIC STRUCTURES

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 13, 5 Apr 78 Author's Certificate No 601716 27 Dec 76

PABELKO, T. V., Red-Banner Riga Institute of Civil Aviation Engineers  
imeni Lenin's Komsomol

[Text] A device including a shaper of input signals, its input being the input of the device and its output connecting to the inputs of amplifiers, also inductive-transformer cells containing each a first and a second circuit of two series-connected induction coils whose free terminals are cell outputs, also a transformer the terminals of whose primary winding are cell outputs and one terminal of whose secondary winding is a cell output connecting through a first capacitor to the center tap of the primary transformer winding and the other terminal of whose secondary winding is hooked on to the junction between the induction coils of the first circuit, while the center tap of the primary transformer winding is connected through a second capacitor to the junction between the induction coils of the second circuit, while the center tap of the primary transformer winding is connected



through a second capacitor to the junction between the induction coils of the second circuit, with a third capacitor hooked on to the same junction, the other terminal of this third capacitor being a cell output, and the center tap of the primary transformer winding also connected through a matching resistor to the output of the corresponding amplifier, with the distinguishing feature that, for broadening the functional range so as to make possible simulation of torsional vibrations, it also includes resistance-capacitance networks and auxiliary amplifiers, the input of each of the latter connecting to the output of the corresponding main amplifier and the output of each connecting to the junction between the inductance coils of the second circuit in the corresponding inductive-transformer cell as well as to the input of the corresponding resistance-capacitance network whose output in turn connects to the corresponding output of the shaper of input signals.

USSR

UDC 621.382

#### AN INSTRUMENT FOR CHECKING CURRENTS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 13, 5 Apr 78 Author's Certificate No 601619 12 Oct 76

ZAPIROV, M. F., AKHRAROV, N. A., and GAFAROV, S. M. Ufa Aviation Institute  
imeni S Ordzhonikidze, Bashkir Division, USSR Academy of Sciences

[Text] An instrument including a split magnetic core of the balancing type in the peripheral slots of which are biasing coils, measuring coils, and output coils, series-matched pairwise with the distinguishing feature that, for broadening its functional range, the core is made of a magnetic material with a nonrectangular hysteresis loop and the cross-sectional area of its undivided segments is equal to the cross-sectional area of one tooth between peripheral slots, the biasing coils in each pair of peripheral slots consist of two windings, each of them connected to an additional potentiometer, and one of the output coils embracing the core around an undivided segment.

USSR

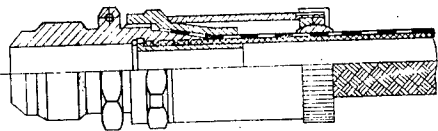
UDC 621.643

#### A FLEXIBLE HOSE REINFORCED WITH A METALLIC BRAIDING

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 13, 5 Apr 78 Author's Certificate No 601517 24 Nov 76

MIRSAYEV, R. N., NABIULLIN, V. KH., BRYUKHANOV, A. M., KRYUKOV, A. I.,  
GLINKIN, I. M., and LUKIN, B. YU., Ufa Aviation Institute imeni S. Ordzhonikidze

[Text] A hose with reinforcement around the terminal and with an external support, with the distinguishing feature that its fatigue limit is raised by means of a spherical three-dimensional hinge joint whose inner member fits over the outside diameter of the hose and whose outer member fits over the external support.



USSR

UDC 621.540

#### A STEPPER DRIVE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 13, Apr 78 Author's Certificate No 601468 5 Jul 76

BONDARENKO, V. N., Rybinsk Aviation Technological Institute

[Text] A drive including hydraulic cylinder with a piston, a stepper motor, and a threaded slider inside the piston, with the distinguishing feature that for higher speed and precision, the stepper motor has been mounted on the piston and its rotor is a sleeve with radial slots, the threaded slider being rigidly fastened to the hydraulic cylinder and fitting inside the sleeve.

USSR

UDC 654.9

#### A DEVICE FOR SIGNALLING OPERATION AT THE PERMISSIBLE LIMITS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602976 13 Jan 76

YUSUPOV, I. YU., MIRONOV, V. V., CHERNYAKHOVSKAYAM L. R., and YUSUPOVA, N. I.,  
Ufa Aviation Institute imeni S. Ordzhonikidze

[Text] A device including a transducer for the angle of attack, the output of which connects to one input of a summing network and to the input of a differentiating circuit, and a comparator whose one input connects to the summator output and other input is connected to a reference-signal generators, with the distinguishing feature that, for a better accuracy, it also includes an amplifier with gain regulation and a transducer for the velocity head, this transducer being connected to one input of the amplifier and the second input of the amplifier connecting to the output of the differentiating circuit, while the amplifier output connects to the second summator input.

USSR

UDC 681.335

#### A DIVIDING DEVICE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602958 23 Aug 76

ZARIPOV, M. F., UTIASHEV, R. I., and URAKSEYEV, M. A., Ufa Aviation Institute imeni S. Ordzhonikidze

[Text] A device including a cylindrical magnetic core with a distributed excitation winding, two hollow magnetic cylinders, two movable ring cores, two wound toroidal cores, and a generator of rectangular pulses, the coils on the toroidal cores being connected to this generator and to the input of a frequency trimmer, with the distinguishing feature that, for simplification, the cylindrical magnetic core has been profiled and is placed inside the coaxial hollow magnetic cylinders, the movable ring cores are placed in the gap between the cylindrical magnetic core and the hollow magnetic cylinders, and the toroidal cores are placed between the ends of the two hollow magnetic cylinders.

USSR

UDC 681.325

# A FREQUENCY-PULSE MULTIPLYING AND DIVIDING DEVICE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602945 8 Dec 75

RODIONOV, V. N., FEDOROV, M. A., ANDREYEV, A. P., LOPUKHOV, V. I., and  
GERASIMOV, V. G., Order of Labor's-Red-Banner Kuybyshev Aviation Institute  
imeni academician S. P. Korolev

[Text] A device including a first trigger whose "1" input connects to the first input of the device, a first and a second NAND circuits whose first inputs connect to the second input of the device, and a second trigger whose "1" output connects to the first input of a third NAND circuit, the second input of the latter connecting to the third input of the device and its output being the output of the device, with the distinguishing feature that, for simplification, it also includes a fourth NAND circuit, while the output of the first NAND circuit connects to the "1" input of the second trigger and to the first input of this fourth NAND circuit, the second input of the latter connects to the "1" output of the second trigger and its output connects to the "0" input of the first trigger, the "1" output of the latter connects to the second input of the first NAND circuit and its "0" output connects to the input of the second NAND circuit, and the output of the latter connects to the "0" input of the second trigger.

USSR

UDC 621.822.5

# A HYDROSTATIC BEARING

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602704 16 Feb 76

MAKUSHIN, A. B. and CHEGODAYEV, D. YE., Order of Labor's-Red-Banner Kuybyshev  
Aviation Institute imeni academician S. P. Korolev

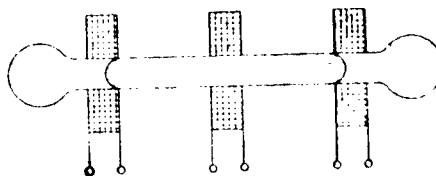
[Text] A bearing which includes a pedestal with a cylindrical cavity and a piston-like thrust collar forming the support chamber, and a throttle in the form of an insert plate made of an elastic-damping material with a center through-hole and placed inside a coical yoke so as to be capable of forward displacement inside the conical pedestal seat, the latter being connected to the support chamber and to a source of working fluid with pressure feed, with the distinguishing feature that, for improving the dynamic characteristics of the bearing, the piston is furnished with a cylindrical stem passing through the hole in the insert plate and with a washer through channels in which the working fluid can pass, this washer being locked at the end of the piston and pressed against the insert plate by a nut, for instance.

## A COMPENSATION-TYPE ACCELEROMETER

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 16, 30 Apr Author's Certificate No 605180 16 May 75

ZARIPOV, M. F., ZAYNUTDINOVA, L. KH., KOVSHOV, G. N., and MUFAZALOV, F. SH.,  
Ufa Aviation Institute imeni S. Ordzhonikidze

[Text] 1. An accelerometer including a tube with an inertial fluid between gas-filled end compartments, a transducer for measuring the displacements of this inertial fluid, an amplifier, and an inverting transducer, with the distinguishing feature that, for design simplification and better reliability, this inverting transducer consists of a feedback winding around the tube with a magnetic fluid acting as the inertial mass. 2. The same as 1., except that, for making possible measurement of acceleration in three directions, it also includes a magic-tee tube with arms along the three orthogonal axes.



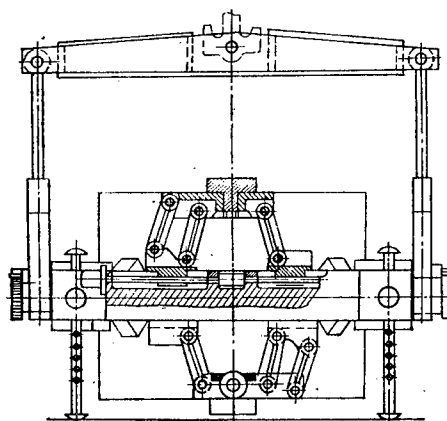
USSR

## A CLAMPING-TILTING DEVICE FOR HEAVY OBJECTS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602 465 30 Mar 76

SHESTERKIN, I. A., YELAGIN, V. V., and KRASNOV, YU. V., All-Union Planning  
Design and Technological Institute of Atomic Plant Equipment and Boilers

[Text] 1. A device including a crossarm with hangers which carry a tilting mechanism with clamps and a rotary drive, with the distinguishing feature that, for a more reliable performance over a wider range of object sizes, the tilter consists of a frame with a center hole and grips around the circumference of the latter, these grips made in the form of trihedral prisms, while trunnions are rigidly mounted in the plane of the frame and perpendicularly to the longitudinal axis of the object, these trunnions interacting with the crossarm hangers and one of them furnished with a gear kinematically coupled to the rotary drive, and while the clamps, in the form of crossheads, are mounted on the frame so as to be capable of reciprocal motion, independently drive, coupled through pantographs to rotary gripping jaws, and on the frame are also mounted a mechanism for centering it relative to the axis of the object and a mechanism for orientating it relative to the center of gravity of the object. 2. The same as 1., except that the mechanism for centering the frame relative to the axis of the object consists of two L-prisms placed inside the frame and driven by a motor with cam shaft. 3. The same as 1., except that the mechanism for orientating the frame relative to the center of gravity of the object contains bars with holes mounted so as to be movable along the frame edges, and on the frame are also mounted electromagnets with clamps engaging the holes in these bars.



USSR

UDC 531.383(091)

PROGRESS IN THE MECHANICS OF GYROSCOPIC AND INERTIAL SYSTEMS IN THE USSR

Leningrad, IZVESTIYA VUSOV PRIBOROSTOYENIYE in Russian No 10, Oct 77 pp 79-96

BUTENIN, N. V., and KLIMOV, D. M., Leningrad, Moscow

[Abstract] A survey of literature dealing with the study of the mechanics of gyroscopic and inertial systems in the USSR is presented including a bibliography of 210 Soviet publications in the field. Brief reviews and descriptions of many of the referenced items are offered. Numerous questions are considered including the effect of frictional forces on the behavior of a gyroscope on a gimbal on stationary and moving bases, the dynamics of single, double and triple-axial gyrostabilizers, the application of the methods of the theory of finite rotations and quaternion theory in the theory of gyroscopic and navigational systems.

The contribution of Soviet scientists to the development of a more general and strict statement of the problems of the mechanics of inertial navigation systems is emphasized: the strict derivation of relations determining the functioning of navigational systems in the absence of errors, derivation and analysis of the error equations with definition of the common properties and differences of inertial navigation systems of different structure, the relations between inertial navigation systems with newtonometers and classical undisturbed dyropendulum devices such as syrocompasses and gyroverticals, and the use of noninertial information to improve inertial systems and create complex systems.

USSR

UDC 622.241.7

A METHOD OF DETERMINING THE TRAJECTORY OF A CURVED WELL

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI in Russian, No 13, 5 Apr Author's Certificate No 601400 22 Jul 76

KOVSHOV, G. N., Ufa Aviation Institute imeni S. Ordzhonikidze

[Text] A container with a rate gyro is moved along the well, with the distinguishing feature that, for a higher measurement accuracy, in the process is also established the initial orientation of the moving container with respect to a reference system of coordinates, the projections of its angular velocity on the tangent and on the binormal to the trajectory as well as the container velocity along the well are measured, whereupon from these data are determined the coordinates of subsequent points on the trajectory as well as the curvature and the twist at these points.

## OSCILLATION DAMPERS USING GYROSCOPES

Moscow STROITEL'NAYA MEKHANIKA I RASCHET SOORUZENIY in Russian, No 1, 1978, pp 38-44

KRAVCHENKO, A. Z., Central Scientific Research Institute of Structural Parts, Moscow

[Abstract] For many problems of oscillation damping, the optimal combination of effectiveness, reliability and cost of vibration damping can be provided using "semiactive" systems such as gyroscopic vibration dampers. The capabilities of such systems are studied as applicable to dynamic damping of the oscillations of structures. Results produced for systems with one degree of freedom are applied to calculation of the effectiveness of the use of gyroscopic dampers to decrease the oscillations of tower structures. An actual plan for a 130m tower, a metal pipe 2.8m in diameter with a mean wall thickness of 25mm, is used as an example. The gyroscopic damping system is shown to be effective, but only when rotors of very sophisticated design and precise manufacture are used. Figures 6; Tables 2; References 11 Russian.



USSR

UDC 521.525

## AN ELECTROPNEUMATIC POSITION SERVOMECHANISM

Moscow OTKRYITIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596739 17 Feb 76

VOROSHILOV, M. S. and BERDYAKOV, N. I., Leningrad Turbine Blade Plant  
imeni USSR Semicentennial

[Text] A servomechanism including a motor whose windings are connected to the input channel and to the output of one of the two position feedback transducers, the latter being coupled through a worm-gear pair and a chain transmission to the motor shaft, and friction clutches, with the distinguishing feature that, for a more precise position tracking, it also includes a pneumatic servomechanism and a reversing spring mechanism kinematically linked through the first friction clutch to one end of the worm, while the other end of the worm is coupled through the second friction clutch to the piston of this pneumatic servomechanism, the chamber of the latter being connected to the output of the other position feedback transducer.

USSR

UDC 621.540

## A TRACKING HYDRAULIC DRIVE

Moscow OTKRYITIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602933 28 Jun 76

DUBININ, YE. N. and FEDROV, S. I.

[Text] The same drive described in Patent No 495656, except that, for a higher accuracy, between it and the cavities of forward-acting power servomechanism there have been inserted throttles with passage ducts whose cross-sectional area satisfies the relation

$$S_{thr} = (0.4-0.5) \cdot 10^{-3} S_{max}$$

where  $S_{thr}$  denotes the cross-sectional area of passages in a throttle and  $S_{max}$  denotes the cross-sectional area of passages in the controller with the gate valve fully open.

USSR

UDC 621.165-783.6

A METHOD OF TURBINE PROTECTION AGAINST RUNNER OVERSPEED

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKE  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596724 23 Jun 76

GOLOVACH, YE. A.

[Text] The method involves closing the valves and increasing the generator load in response to signals indicating that the runner has exceeded given speed and acceleration levels, with a time delay before switching over the electric motors for station auxiliaries from the generator to a standby voltage source, in response to a signal indicating that the generator has been disconnected from the line, with the distinguishing feature that, for a more effective protection, the level of the dumped load is recorded while the generator is disconnected from the line and the time delay before switching the motors over is lengthened as the dumped power is found to be increasing.

USSR

UDC 624.132.33

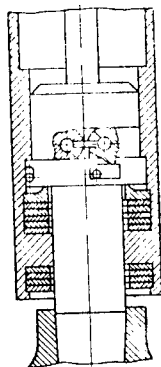
AN IMPACT TOOL FOR CLEARING WELLS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596697 13 Mar 73

SUINISHNIKOV, B. V., KAMENSKIY, V. V., VARNELLO, E. P., TUPITSYN, S. K., and NAZAROV, B. V., Institute of Mining, Siberian Division of the USSR Academy of Sciences

[Text] 1. A tool including a case, a mallet, the stem of a drill bit with a plunger, and a mechanism to set the driving member in rotation, with the distinguishing feature that, for a more efficient performance, this rotating mechanism consists of pull rods, each hinge joined to the plunger and to a free running clutch, the latter mounted on the stem of the driving member and movable along it. 2. The same as 1., except that, for increasing the initial torque on the driver, between the free-running clutch and the

plunger there is a multistep lock with profiled surfaces. 3. The same as 1., except that the pull rods are elastic elements.



USSR

UDC 621.791.75

#### A METHOD OF WELDING TITANIUM PIPES

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596395 17 Apr 76

POLYAKIV, V. M., ABRAMOV, YE. V., KUDOYAROV, B. V., YAVNO, E. I., LYASHENKO,  
V. I., MIL'RUD, S. R., and TARADIN, V. A.

[Text] One pipe is placed inside the other to form a lap joint which is then welded, with the distinguishing feature that for joining pipe blanks of different thicknesses nondefectively with a uniform strength of bond to the base metal and for raising the fatigue limit under vibration loads, the shape of the welding seam is improved by stepwise flat ground areas of the pipe piece with larger diameter and wall thickness to the dimensions

$$H = (2-2.5)S$$

$$B = (1-1.2)S$$

where H is the height (length) of the ground area,

S is the wall thickness of the pipe with smaller diameter,  
and B is the thickness of the edge left after stepwise grinding,  
the pipe being rotated twice during the welding operation, while it is held in the vertical position, the first time with the electrode tilted "backward" and the second time with the electrode tilted "forward", with simultaneous variation of the electrode inclination angle in the vertical plane.

USSR

UDC 621.777.07

# A TOOL FOR EXTRUSION OF NOT EASILY DEFORMABLE MATERIALS IN SHELLS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596317 6 May 76

KOLPASHNIKOV, A. I., VYALOV, V. A., FEDOROV, A. A., PETROV, A. P., and  
DOLBINOV, YU. D., Moscow Institute of Aviation Technology imeni  
K. E. Tsiolokovskiy

[Text] A tool consisting of a barrel, a die with a calibrating hole, and a plunger, with the distinguishing feature that, for increasing the yield of good material and improving the product quality, the die is placed in the barrel with an annular clearance equal to 0.97-0.98 of the raw shell thickness and in the bottom of the barrel are radial holes with a total area equal to 0.1-0.25 of the area of the calibrating hole in the die.

USSR

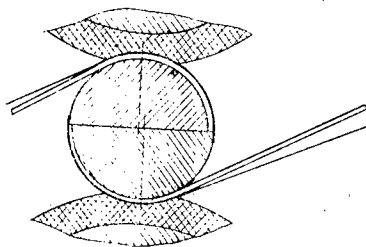
UDC 621.981.21

# A TOOL FOR SHEET BENDING

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 13, 5 Apr 78 Author's Certificate No 601065 4 Jan 76

NIKITIN, A. V., ZAKIROV, I. M., and LAPIDUS, YU. M., Order of Labor's-Red-Banner Kazan' Aviation Institute imeni A. N. Tupolev

[Text] A tool including a rigid forming mandrel-roller between bending rollers which are covered with an elastic material, with the distinguishing feature that, for improving the product quality, the rigid mandrel-roller is a compound one consisting of two halves shifted relative to each other in the cross-sectional plane and thus forming protrusions to the tips of which have been fastened elastic retainer strips.



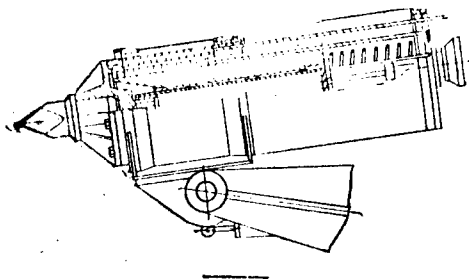
## AN ELECTRODYNAMIC IMPACT MECHANISM

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602676 10 Dec 76

SHAKOVICH, E. T., NARYZHNYI, P. P., VOLOSHIN, N. V., CHERNYY, I. P., and  
BARU, YU. A., Dnepropetrovsk Division, All-Union Scientific Research and  
Planning Design Institute of Mining Machinery

Special Electrical Equipment Design and Manufacturing Office

[Text] A mechanism including an active tool and a hollow guide cylinder with an axially oriented inertial mass inside, a stator and an armature with electrical coils connected to a generator of electric pulses, these coils being axially displaceable in opposite directions by an electrodynamic force and thus capable of transmitting an impact to the tool, with the distinguishing feature that, for making it operative in various positions in space, there are also furnished a housing for the stator and a damper in the tail part of the guide cylinder, the latter for stopping and returning the armature together with the tied to it inertial mass after an impact, while the stator is mounted inside the housing and joined to the tool.



USSR

UDC 621.981.1.044

#### A TOOL FOR BENDING PIPE BLANKS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602265 3 Jan 76

VORONOV, A. I., KRYZHNYI, G. K., and VOLOVA, A. I., Kharkov Aviation  
Institute

[Text] 1. A tool including a case with transmission fluid and two parts of a punch with forming grooves, one part stationary and rigidly joined to the case, one part spring mounted against it with the possibility of being displaced by a hydraulic impact, the latter part also having lateral recesses at both ends of its groove into which there fit detents with holes for the ends of a pipe blank, and a cover over the holes in these lateral detents, with the distinguishing feature that, for bending the pipe ends, it is also furnished with a rod rigidly connecting the case to the stationary part of the punch, the groove in the latter as well as the groove in the movable part both having convex and concave forming surfaces, the detents being made rotatable and with bearing surface which make contact with either the stationary or the movable part of the punch when in the initial or in the working position, respectively, and with active curved surfaces which make contact with the curved surfaces formed along the recess walls in the movable part of the punch, and with the cover over its holes made in the form of a bushing fastened to the case and slipped over the rod.

2. The same as 1., except that, for easier removal of a finished pipe, the movable part of the punch consists of two symmetrical halves held together by a ring with pins.

USSR

UDC 618.646

#### A POWER SPRAYER

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 16, 30 Apr 78 Author's Certificate No 605202 1 Dec 76

MALYGIN, N. A. and PODOL'SKIY, A. A., Order of Labor's-Red-Banner Kuybyshev  
Aviation Institute imeni academician S. P. Korolev

[Text] 1. A sprayer including a pulse generator connected to the input of an electromechanical vibrator, the latter connected to a capacitor which is also connected to the sprayer, with the distinguishing feature that, for better performance precision and reliability, it also includes a transducer measuring the powder concentration in the sprayer, an amplifier, a detector,

and a filter, all in series and the filter output connecting to the input of the pulse generator. 2. The same as 1., except that the transducer measuring the powder concentration is made in the form of an insulated metal ring mounted coaxially on the sprayer nozzle.

USSR

UDC 621.937.02

#### A BLADE FOR METAL CUTTING

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARANYYE ZNAKI in Russian, No 16, Author's Certificate No 604637 12 Jan 76

KALINOBRODSKIY, A. O., KONOPENKO, V. G., PYSHNYAK, L. G., and BURYAKOVSKIY, V. V., Kharkov Aviation Institute

[Text] A blade consisting of three parts, the center part being movable by a plunger relative to the rest, with the distinguishing feature that, for improving the quality of cuts, all parts are joined in a row through their large faces and the width of each is equal to the blade width.

USSR

UDC 681.7.013.05

#### EQUIPMENT FOR THE MANUFACTURE OF THE MIRROR BLANK OF THE BTA LARGE AZIMUTHAL TELESCOPE

Leningrad OPTIKO-MEKHANICHESKAYA PROMYSHLENNOST' in Russian, No 1, Jan 78, pp 23-26, manuscript received 3 Feb 77

BUZHINSKII, I. M., VIL'NER, D. YE., STEPANOV, S. YE.

[Abstract] A unique system of equipment has been constructed for the technological process of manufacturing the blank for the main mirror of the 6-meter BTA large azimuthal telescope. This article describes the regenerative melting bath, the pouring device, including a 5-section platinum tube, and the equipment system for casting of the blank, including a self-propelled truck for transportation of the mold, a frame to hold the mold, a cast-iron 6-section bolted shell, lined with lightweight brick, and a heated convex mold cover. Photographs are presented illustrating the melting bath, annealing furnace, transportation of the mold, tilting of the blank during preliminary working, turning of the mold on a turret lathe, the preliminary worked blank, and the mirror blank on the machine for final working. The special KU-158 turret lathe, measuring 9,765 by 17,600 by 8,615mm, is described. Figures 2; References 3 Russian.

USSR

UDC 626.5

AN INCLINED SHIP DERRICK WITHOUT ENCLOSURE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596693 26 May 76

KOSHKIN, V. YA., YEREMEYEV, B. V., SIMAKOV, G. V., and MOSHKOV, A. B.,  
Leningrad Division, All-Union Order-of-Lenin Planning Surveying and Scientific  
Research Institute imeni S. Ya. Zhuk

[Text] 1. Ship derrick including a chute and a movable gate, with the distinguishing feature that, for better performance, in the middle of the gate there is an opening which can be covered with a shutter. 2. The same as 1., except that this shutter is a globe valve.

USSR

YDC 621.869.3

A SHIPBOARD DEVICE FOR DROPPING AND HOISTING OF OBJECTS ON ROUGH WATER

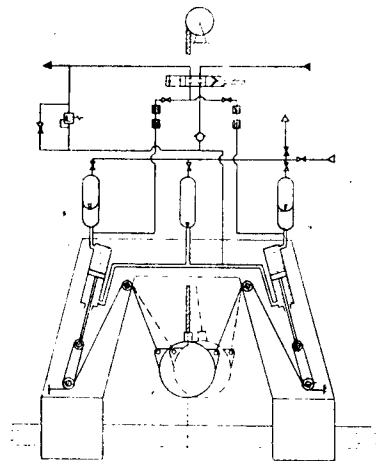
Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596497 15 Dec 75

PEYMER, L. M., VINOKUR, S. A., and KUZ'MENKO, V. I.

[Text] A device including a hoist mechanism and a system for damping out transverse as well as longitudinal swings of an object suspended on ropes, the damper comprising hydraulic cylinders rigidly mounted on the ship deck and piston rods with pulleys mounted on the ends for stay ropes, with one set of like cylinder compartments (e.g., those under the piston rods) interconnected through a hydraulic system including a pneumo-hydro surge tank, with the distinguishing feature that, for safe operation with objects and prevention of their damage by more reliable damping of longitudinal and transverse swings, which includes ensuring a continuous damping characteristic as far as transverse swings are concerned and reducing the dynamic loads on the stay ropes and the object, also ensuring that the object can be centered relative to the ship deck and that the stay ropes can be paid out and drawn in without the use of winches, this mechanism contains a single system for damping out vertical, longitudinal, and transverse swings of the object, this system consisting of a bow damper and a stern damper, each stay rope of which being kinematically linked to a double-action hydraulic cylinder, each stay rope fastened at the base end directly to the ship deck and at the tracking end to the object, while the other like compartments of the hydraulic damper cylinders (e.g., those through which the piston rods pass) are coupled through a pipe to a pneumo-hydro surge tank



for damping out vertical and longitudinal swings, with each opposite compartment of these cylinders coupled directly to a penumo-hydro surge tank for damping out transverse swings and for compensating any nonuniformity of the rate of change in the length of stay ropes, this hydraulic system including, moreover, handles and backwater valves.



USSR

UDC 623.958

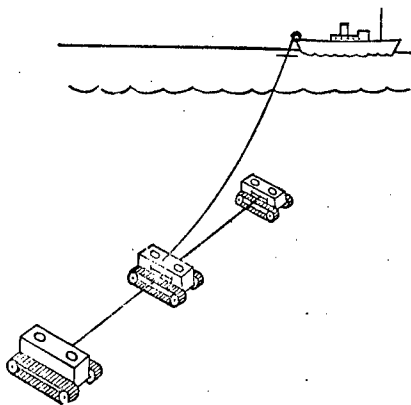
# A DEVICE FOR HYDROGRAPHIC TRAWLING OF THE SEA BOTTOM

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602407 1 Jul 76

KISILEV, V. A.

[Text] A device which includes trawling elements joined to a tugging system with an instrument for recording underwater obstacles, with the distinguishing feature that, for a more reliable performance, the tugging system consists of an array of self-propelled carts equipped with a cable-rope and an automatic

lock for stopping upon an encounter with an underwater obstacle, while the trawling elements are hinged between them.



USSR

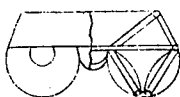
UDC 627.951

#### A DISASSEMBLABLE CATAMARAN

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHELNNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 16, 30 Apr 78 Author's Certificate No 604737 20 Jul 76

IMITRIYEV, L. S. and UMRKHIN, M. F.

[Text] 1. A disassemblable catamaran including inflatable floats with V-shaped cross sections, formed by lengthwise inflatable bags and each having both an inner and an outer board, also a foldable hull consisting of a platform, with the distinguishing feature that, for a more convenient seating of the crew as well as for increasing the spaciousness and the load capacity of the catamaran, each float is furnished with two lengthwise inflatable bags along its inner and outer board respectively, these bags being transversely constricted by segments of respective upper and lower rims which join them on top to the flexible shell and underneath to one another, while the flexible shell is furnished with an extra lengthwise inflatable bag in the middle between the floats. 2. The same as 1., except that the extra middle lengthwise bag, the flexible shell, and the platform between the catamaran floats are shorter than those floats.



USSR

## NONDESTRUCTIVE TESTING OF COLD-FORMED STEEL PIPES FOR MECHANICAL PROPERTIES

Sverdlovsk DEFEKTOSKOPIYA in Russian, No 3, Mar 78 pp 49-53 manuscript received 3 Mar 77

KOKHMAN, L. V., BURGANOVA, V. A., FRIDMAN, L. A., and TABACHNIK, V. P.,  
Pervoural'sk Novelty Pipe Plant, Institute of Metal Physics, Ural Science  
Center of the USSR Academy of Sciences

[Abstract] A coercimeter has been built for nondestructive testing of cold-formed pipes of carbon steel (grades 10, 20, 35, 45). The electromagnet of this KIMF-1 instrument comes with interchangeable pairs of pole shoes. In order to cover the entire range of pipe sizes (5-100 mm diameter and 0.25-15 mm wall thickness) with the least number of pole shoe replacements, so as to ensure efficient and reliable testing without a noticeable loss in sensitivity, it is necessary to establish correlations between mechanical properties and magnetic properties (coercive force) of this pipe assortment. This was done in two series of tests, one with the pole shoe radius either several times larger than the pipe radius. Air gaps between pole shoes and test specimen were simulated with layers of paper strips. These tests have established a correlation between coercimeter readings (demagnetizing current) and the coercive force of pipe steel, almost unaffected by the pole shoe radius as a factor. On the basis of these results, two pairs of pole shoes with the same optimum length and cross-sectional area but different radii have been selected to cover the entire test range. Finally, the mechanical properties of these four grades of steel have been calibrated on a circular nomogram-dial against the demagnetizing current (coercimeter readings). These properties are tensile strength ( $\text{kgf/mm}^2$ ), yield point ( $\text{kgf/mm}^2$ ), and percent elongation. The current scale represents averages of three measurements at each test point. Such a nondestructive test has already resulted in an annual saving of 15,000 rubles in one pipe drawing plant alone. Figures 3; Tables 1; References 7 Russian.

USSR

UDC 535.24

## AN INSTRUMENT FOR MEASURING OPTICAL DENSITY

Moscow OTRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596835 1 Mar 76

MAMONTOV, G. M., POTASHNIKOV, A. K., SITNIKOV, G. F., and TKACH, S. YE.,  
Special Design Office for Scientific Instruments, Siberian Division of the  
USSR Academy of Sciences

[Text] An instrument including a light source, a luminaire, a semitranslucent

mirror, a photo carrier, two photoelectron multipliers, and a logarithmic converter whose inputs connect to the photoelectron multipliers, with the distinguishing feature that, for a higher measurement accuracy, it also includes a reference light source optically coupled to the photoelectron multipliers, a memory device, a summing network, and a control circuit, the output of the logarithmic converter connects to one of the summator inputs and to one of the memory inputs, while the memory output connects to the second summator input and the outputs of the control circuit connect to both light sources as well as to the second memory input.

USSR

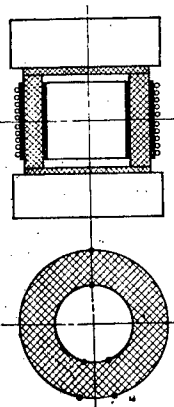
UDC 534.232:534.612-14

# AN INSTRUMENT FOR MEASURING SOUND PRESSURE

Moscow OTRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596834 4 Feb 76

KOGAN, S. L., DOLYA, V. K., and VASIL'YEV, YE. M., Order of Labor's-Red-Banner Rostov State University

[Text] An instrument operating by the method of piezoelectric compensation and including a generator, a compensation-type transducer in rigid acoustic contact with the active surface of a sensing element, and a measuring instrument, all in series, with the distinguishing feature that, for ensuring a higher measurement accuracy and self-calibration, the compensation-type transducer is furnished with permanent magnets mounted with opposite polarities and through sealing spacers on its end, while the sensing element is a current conducting coil mounted coaxially with the transducer.



USSR

UDC 531.717.1:53.082.32

#### A PNEUMOELECTRIC DIMENSIONAL GAUGE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596827 7 Jun 76

KISELEV, M. I., FERENTES, V. A., and ZHURAVSKIY, A. A., Order of Labor's-Red-Banner Kazan' Aviation Institute imeni A. N. Tupolev

[Text] A dimensional gauge including input throttles connected into a pneumatic bridge circuit, a measuring nozzle, a nozzle for generating back pressure, a throttle for sensitivity regulation, thermistors with nozzles across the bridge diagonals, acoustic filters, and an electric circuit with an indicating instrument connected to the thermistors, with the distinguishing feature that, for a higher measurement accuracy, the filters are made in the form of conical cases containing conical elements, these elements have inner cavities with outlet channels to the surface, and the input throttles are placed eccentrically at the bases of these elements.

USSR

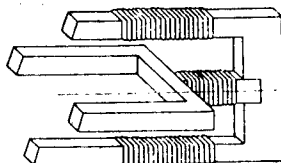
UDC 681.12

#### A DEEP WELL-HEAD FLOWMETER

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TAVARNYYE ZNAKI  
in Russian, No 13, 5 Apr 78 Author's Certificate No 601403 19 Nov 76

YEFREMENKO, N. A., ANTONOV, V. A., KOSTOMAROV, V. A., and SHORGINA, L. YE., Special Design Office of the All-Union Scientific-Industrial Combine for Automation of Extraction and Processing of Natural Gas and Helium

[Text] An instrument including a turbine which rotates in bearings with an armature on the shaft, and a differential transformer with coils around a magnetic core, with the distinguishing feature that, for improving the performance reliability in gas wells by reducing the effect of bearing wear on the measured signal, the magnetic core is made of two C-shaped forks orthogonally one inside the other, with the end faces of all fork arms cut obliquely, with the two arms of the outer fork unequal in length, and with the two arms of the inner fork equal in length, the length of both being intermediate between the lengths of the other two.



USSR

UDC 534.232

# AN INSTRUMENT FOR AUTOMATICALLY MEASURING FLOW VELOCITY

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602866 28 Jun 76

BORTSOV, V. L. and KHAMIDULLIN, V. K., Leningrad Institute of Aviation  
Instruments

[Text] The same instrument described in Patent No 546818, except that, for more accurate and faster measurements, it includes a flip-flop whose input connects to the third commutator output, also two AND circuits whose first inputs connect to the control inputs of phase meters and second inputs are tied together at the flip-flop output, also two summing networks whose first inputs connect to the outputs of the phase meters and second inputs connect to the outputs of the corresponding AND circuits and outputs to the integrator inputs.

USSR

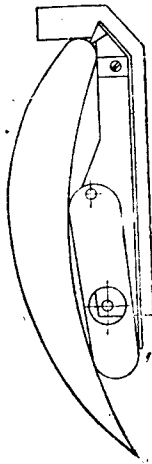
UDC 620.179.14:621.226.2

# A DEVICE FOR DEFECTOSCOPY OF THE EDGES OF TURBINE BLADES

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602847 11 May 76

KHURGIN, M. E.

[Text] 1. A device including a support prism and in inductive electrical transducer spring mounted against it, with the distinguishing feature that, for a more reliable detection of defects along edges of variable curvature, it also includes a lever whose one end is joined to the prism through a hinge axle, while the spring is a flat one and fastened to the prism, its one end carrying the transducer within the prism angle and the other end engaging the free end of the lever. 2. The same as 1., except that the end of the lever on the prism side is cam.



USSR

UDC 536.2

# AN INSTRUMENT FOR MEASURING THE THERMAL CONDUCTIVITY OF GASES

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNANI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602839 17 May 76

OBERMAN, F. M., KRUGLYY, S. I., UMANSKIY, A. S., GORSHKOV, YU. A., and  
KOLOKOL'TSEVA, A. L., Institute of High Temperatures, USSR Academy of Sciences

[Text] An instrument including a bridge circuit coupled to a voltage supply and having a filament probe in one arm, a high-voltage generator, and a protective circuit, an amplifier, and a recorder, all three interconnected, with the distinguishing feature that, for a higher measurement accuracy, the bridge is an a-c one with a resistor-diode network in parallel across the output diagonal and with the output of this network connected through the amplifier and a detector to the recorder, the latter being built on a balancing circuit with a MEMORY element connected to its input through a control switch.

USSR

UDC 541.12.035

AN INSTRUMENT FOR MEASURING THE VOLUME DENSITY OF ELECTRIC CHARGE ON PARTICLES  
IN A GAS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602829 6 Dec 76

KOL'TSOV, B. YU., NEYMAN, L. A., POPOV, B. I., RUMYANTSEV, V. V., and  
TURUBAROV, V. I., Leningrad Institute of Aviation Instruments

[Text] An instrument including a case with cylindrical electrodes inside, an outer one and an inner one, oriented coaxially with the gas stream and producing a transverse electric field, both connected to a source of voltage pulses, and an inductive measuring electrode connected to the measuring circuit, with the distinguishing feature that, for a higher measurement accuracy, between the cylindrical electrodes there have been placed coaxial cylinders on which slow particles precipitate, these cylinders being separated by gaps whose width increases nonuniformly toward the axis of the stream, the odd cylinders (counting from the axis of the stream) connected to the outer electrode and the even cylinders connected to the inner electrode.

USSR

UDC 621.317.318

AN INDICATOR FOR AUTOMATIC MEASUREMENT OF THE PARAMETERS OF MULTITERMINAL  
MICROWAVE NETWORKS

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 16, 30 Apr 78 Author's Certificate No 605183 14 Mar 77

PRUDIUS, I. N., ROMANYUK, M. G., and GNATCHUK, N. N., Order-of-Lenin L'vov  
Polytechnic Institute

[Text] An indicator which includes a measuring channel composed of a pre-amplifier, an attenuator, a selective amplifier, a synchronous detector with a lowpass filter, and a d-c amplifier, all connected in series and the output of the d-c amplifier connecting to the vertical deflection plates of a CRO, with the distinguishing feature that, for making possible simultaneous measurement of all parameters of a multiterminal network with a higher accuracy, it also includes a control circuit and a generator of a test voltage, both connecting to an inserted  $n+m$ -channel commutator whose  $n-1$  inputs connect to inserted attenuators and  $\frac{n-1}{2}$  inputs connect to inserted amplifiers connected to attenuators, while the outputs of the commutator connect to the input and the output of the measuring channel.



USSR

UDC 534.232

# AN INSTRUMENT FOR MEASURING THE SOUND PRESSURE IN A FLUID

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 16, 30 Apr 78 Author's Certificate No 605117 6 Dec 76

BERDNIK, V. I., DMITREVSKIY, N. N., PAVLOV, L. YE., and SIL'VESTROV, S. V.

[Text] An instrument including a compensation-type transducer in the form of a closed piezoceramic shell with main electrodes, a voltage source, and a null indicator with a sensing element, with the distinguishing feature that, for a better measurement accuracy during temperature fluctuations and for a design simplification, the piezoceramic shell has been tangentially polarized and the main electrodes deposited on one of its surfaces in the form of longitudinal strips at equal angular distances and with transverse connections to respectively the common output or the signal output of the voltage source, while the sensing element of the null indicator is an array of electrodes deposited on the other surface of the shell, similar but opposite to the main electrodes, namely those running opposite to the main electrodes connected to the common output of the voltage source being connected to the signal input of the null indicator and those running opposite to the main electrodes connected to the signal output of the voltage source being connected to the common input of the null indicator.

USSR

UDC 531.71

# A LAID-ON EDDY-CURRENT TRANSDUCER

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 16, 30 Apr 78 Author's Certificate No 605086 5 May 76

ABAIMOV, M. A., BUROV, V. N., SAVOYAN, A. G., LIMANOV, I. A., and SHATERNIKOV, V. YE., Order of Labor's-Red-Banner Kuybyshev Aviation Institute imeni academician S. P. Korolev

[Text] A transducer consisting of two identical measuring coils connected in series opposing and one excitation coil inside a case, with the distinguishing feature that, for a more accurate measurement of displacements, the axes of both measuring coils are parallel to the plane of the excitation winding but their planes are mutually perpendicular and intersect along the axis of the axis of the excitation coil, being oriented so that the winding of one of the measuring coil is at a  $30 \pm 2^\circ$  angle to the base of the transducer case facing the inspected surface.

USSR

UDC 622.214.7

AN INSTRUMENT FOR DETERMINING THE CURVATURE OF THE CLEARANCE ALONG A DEFLECTOR

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 16, 30 Apr 78 Author's Certificate No 604977 16 Jul 74

KOVSHOV, G. N., Ufa Aviation Institute imeni S. Ordzonikidze, KIL'DIBEKOV,  
A. B., Bashkir Division of the USSR Academy of Sciences

[Text] An instrument consisting of a chassis on top of which a frame in the form of a float and two magnets are mounted, with the distinguishing feature that, for increasing the vibration resistance and improving the measurement accuracy, it also has two auxiliary magnets adjoining the main magnets, with their bottom surfaces on the longitudinal axis of the chassis, mounted inside the frame pairwise at its two ends and facing each other with like polarities.

USSR

UDC 622.24.17

AN INSTRUMENT FOR DETERMINING THE AZIMUTH OF A CLEARANCE HOLE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 16, 30 Apr 78 Author's Certificate No 604976 21 Jun 74

KOVSHOV, G. N., ALIMBEKOV, R. I., ZAVADSKIY, V. V., and KIL'DIBEKOV, A. B.,  
Ufa Aviation Institute imeni S. Ordzhonikidze, Bashkir Division of the USSR  
Academy of Sciences

[Text] An instrument consisting of an outer frame, an inner frame, an eccentric plumb, and three ferromagnetic probes spaced with their axes  $120^\circ$  apart, with the distinguishing feature that, for improving the accuracy of azimuth determinations and reducing the amount of necessary computations, these ferromagnetic probes are furnished with signal coils and magnetizing coils; the former connected in a wye and the latter connected in series.

USSR

UDC 535.232.61

# SELECTIVE RECEIVERS FOR THE 0.2-0.3 $\mu$ m SPECTRAL REGION

Leningrad OPTIKO-MEKHANICHESKAYA PROMYSHLENNOST' in Russian No 3, Mar 78  
pp 60-63 manuscript received 6 May 77

SOROKIN, O. M., candidate of sciences

[Abstract] The author briefly surveys the most promising photocells and photomultipliers with selective sensitivity in the ultraviolet region. It is shown that recently developed photosensitive devices in combination with filters and amplifiers that work on currents down to  $10^{-14}$  A can be used to make receivers that are highly selective and sensitive in the 0.2-0.3- $\mu$ m range. A photometer utilizing these elements is described with interchangeable filters and detectors. With a combination of the FEU-116 and a PVA film filter, this photometer has a sensitivity that drops by 9.5 orders of magnitude in the 240-500 nm range. The instrument has a radiant flux range of  $4 \cdot 10^{-14}$ - $2.5 \cdot 10^{-8}$  W. The most stable combination is an F-29 photocell with a PVA filter. The spectral sensitivity of this combination varied by only 15% over a period of a year. The author thanks G. A. Lebedeva for taking part in the measurements. Figures 4, References 8: 7 Russian, 1 Western.

USSR

UDC 681.2:546.3.001.5:669

# AN INSTALLATION FOR INVESTIGATION OF THE RADIATIVE CAPACITY OF METALS AND ALLOYS

Moscow IZMERITEL'NAYA TEKHNICA in Russian, No 10, Oct 77, pp 61-63

PELETSKII, V. E., SHUR, B. A.

[Abstract] An installation is described which allows measurement of the integral hemispherical radiative capacity in the high temperature area using small specimens of practically any geometry. The installation utilizes the method of heating of the specimen by electron bombardment. A schematic diagram and cross-sectional drawing of the instrument are presented. The installation provides reliable information on the integral hemispherical radiative capacity of metals and alloys in the high temperature range. Figures 3; References 7: 5 Russian, 2 Western.

## THE EIP-9M AUTOMATIC DUST METER

Moscow IZMERITEL'NAYA TEKHNIKA in Russian, No 12, Dec 77, pp 66-67

PODOL'SKII, A. A., LOGVINOV, L. M.

[Abstract] The Kuibyshev Aviation Institute imeni S. P. Korolev has developed an automatic dust meter, the EIP-9M, in which an optical transducer is used to measure the content of particles less than 5  $\mu\text{m}$  in diameter, and a charge-induction transducer is used to measure the content of particles over 5  $\mu\text{m}$  in diameter. The charge-induction transducer operates by formation of signals proportional to the surface area of the particles measured, with subsequent recording in various channels, depending on the amplitude of the pulses. The device can trace continuous changes in dust content, determine the dynamics of daily and seasonal changes, and monitor the operation of ventilation systems and air filters. The device has been tested in electronic laboratories and factories, at various times of day, with particle contents ranging from 1200-18,000 particles per liter. Figures 2: Table 1; References 3: 2 Russian, 1 Western.

USSR

UDC 681.372.02

## A DEVICE WITH RASTER OPTICS FOR REPRODUCING A BACKING STORE

Leningrad OPTIKO-MEKHANICHESKAYA PROMYSHLENNOST' in Russian No 3, Mar 78  
pp 23-27 manuscript received 21 Jun 77

KAUSHINIS, S. K., candidate of sciences and BARZDAYTIS, V. YU., candidate of sciences

[Abstract] The article describes a device intended to reproducing binary information recorded on a metal substrate in conjunction with a lens raster. The instrument contains an optical channel, a discrete device for positioning the information cassette, an electronic control unit and a photoreception module. The storage module is a raster information cassette containing 256 x 256 information frames with a spacing of 0.4 mm. A binary "1" is represented by an 8- $\mu$ m perforation in the information medium. The axes of the raster lenses coincide with the middle of the information frames. The metal film carrying the information is placed in the forward focus of the raster lens. In data reproduction, the optical axis of the raster lens of the frame to be read out is registered with the optical axis of the system. Reproduction quality depends on the accuracy of registration and on the lighting system used. The proposed unit reproduces information from a raster cassette with capacity of  $4 \cdot 10^7$  bits in 0.6 s. Figures 4, References 8: 4 Russian, 4 Western.

USSR

UDC 535.88:629.7:018.3

## A PHOTOMETER FOR SOLAR SIMULATORS

Leningrad OPTIKO-MEKHANICHESKAYA PROMYSHLENNOST' in Russian No 3, Mar 78  
pp 21-23 manuscript received 17 May 77

KUPRIYANOV, YE. S., KRASNOSTANOV, R. G. and LUK'YANOV, A. I.

[Abstract] The block diagram, basic parameters and optical system are given for a photometer designed for calibrating solar simulators in the spectral range of 0.4-1.2  $\mu$ m. The instrument is made as two independent modules that differ in modulator design. The optical system includes an objective lens, modulator, condenser and radiation receiver. A neutral filter ring is placed in front of the objective lens. The light flux modulator is located in the focal plane of the lens. In the first module, the modulator is a plane-parallel plate with transparent and opaque alternating bands and is attached to the tine of a tuning fork. The amplitude of oscillation is equal to the width of the bands. The width of the bands is made so that 100% modulation is ensured regardless of seasonal variations in the apparent

diameter of the solar disk. In the second module the modulator is a rotating disk with alternating slots having dimensions analogous to those on the tuning-fork mask. In front of the disk is a stationary trapezoidal window with width ensuring the same number of slots visible at any instant. Stability is monitored by thermostatically controlled LED's placed between the condenser and the photosensor. The radiation receiver is an FD-7K photodiode, and the signal is recorded by a KSP-4 chart-recording potentiometer. Tests from 1969 to 1972 showed high reliability and an instrumental error of less than 1.6%. Figures 2; References 7: 6 Russian, 1 Western.

USSR

UDC 522.2

#### A SYSTEM OF PROGRAM-CONTROLLED DRIVES FOR A LARGE AZIMUTHAL TELESCOPE

Leningrad OPTIKO-MEIHANICHESKAYA PROMYSHLENNOST' in Russian, No 1, Jan 78, pp 17-21, manuscript received 31 Mar 76

ITSKOVICH, G. A., HAISHUL', A. S., SHVARTSMAN, YU. B.

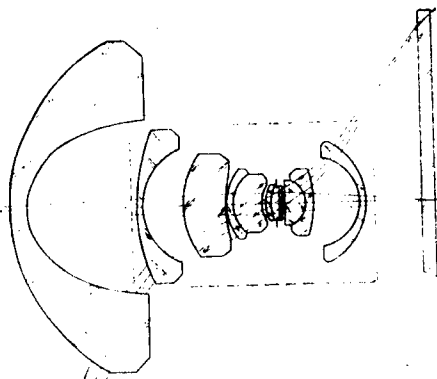
[Abstract] The primary difficulties involved in control of the movement of a telescope on an azimuthal mount result from the need to move the telescope at uneven speeds relative to the two axes and to compensate for the uneven rotation of the star field in the focal planes of all of the optical systems of the telescope as an object is tracked. Analysis of possible control principles for an azimuthal telescope has shown that control can be successfully achieved by the combined operation of digital automatic telescope control systems for the azimuth and zenith distance, a digital programmed system for compensation for the rotation of the field and photoelectric guidance systems. A structural diagram of the digital drive systems for programmed control of a large azimuthal telescope is presented. The drives, computer hardware, indication and signaling apparatus and the organization of the software for the telescope are described. The first results of test operation have demonstrated that the principles of control are correct and the control system is convenient of use as well as safe. Figures 4; References 13 Russian.

## AN ULTRA-WIDE-ANGLE ORTHOSCOPIC OBJECTIVE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 16, 30 Apr 78 Author's Certificate No 605187 19 Nov 76

RUSINOV, M. M. and KORSKAYA, M. G., Central Scientific Research Institute  
of Geodesy, Aerial Photography, and Cartography

[Text] An objective containing a negative meniscus with an aspherical back surface and a system of four stages, the first and the fourth comprising solitary negative menisci with their convex sides toward the diaphragm, with the distinguishing feature that, for better correcting the aberrations over the field of vision, the second stage comprises a positive solitary meniscus with its convex side toward the diaphragm, a convexo-convex lens directly before the diaphragm, and a compound lens, the negative meniscus of one component with a dispersive power equal to at least 57.3 bonded to the positive meniscus of the other component, the difference between their dispersive powers not exceeding 13, while the third stage comprises a compound lens, the negative meniscus of one component with a dispersive power not exceeding 34.6 bonded to the positive meniscus of the other component, the difference between their dispersive powers exceeding 29.



USSR

UDC 771.531.351.4.023

THE GRADATION CHARACTERISTICS OF POSITIVE COLOR MOTION PICTURE FILMS

Moscow TEKHNICA KINO I TELEVIDENIYA in Russian, No 1, Jan 78, pp 18-26

ARTYUSHIN, L. F., KURPIK, V. V., SEMENOVA, N. F., National Scientific Research Institute of Cinematography

[Abstract] An analysis is presented of the indicators which determine the linear and lower nonlinear sections of the characteristic curves of "orvo" type TsP-8R and PTs-7 motion picture films. Methods of determination of the upper gradient by the method of secants in graphic sensitometric testing, according to its agreement with the objective contrast factor determined by the method of least squares on a computer, are analyzed. Various methods of determination of the lower gradient by the method of secants as a quantitative characteristic of the curvature of the lower portion of the curve are studied. The concept of the density of the beginning of the linear section of the curve is introduced and it is suggested that its lower section be described by its length, using computers for sensitometric testing. A method is suggested for determination of the parameter of the model curve of control of the processes of manufacture and development of color motion picture film, characterizing the lower, curved section. Figures 5; Tables 14; References 8: 6 Russian, 1 Eastern European, 1 Western.

USSR

UDC 791.44.022:771.44]--519

REMOTE CONTROL SYSTEM FOR ILLUMINATION USING A SPECIALIZED ELECTRONIC DIGITAL CONTROL MACHINE

Moscow TEKHNICA KIMO I TELEVIDENIYA in Russian, No 1, Jan 78, pp 27-33

KISELYEV, YE. V., KORNIYENKO, V. I., KOTLYAR, A. A. and OSKOLKOV, I. N., National Scientific Research Institute of Cinematography; Saratov Radio and Television Center, Samarkand "Kinap" Plant

[Abstract] Samarkand's "Kinap" Plant used data supplied by the National Research Institute of Cinematography to develop a new lighting system called "upravleniye" [control], which has been put in use at the Saratov Radio and Television Center. The system consists of incandescent lamps with remotely controlled actuating mechanisms and elevating devices, tacks containing thyristor power supply voltage regulators, swtiching, distribution and relay devices. At the center of the system is a special-purpose digital control device for remote programmed control of the entire system. The device allows light sequence programming, recording and changing of



programs, remote selective control of lighting and automatic centralized control of all lights on a stage. Figures 12.

USSR

UDC 621.327

SPECTRAL DENSITY OF THE ENERGY BRIGHTNESS OF TYPE DKsSHRB-150-A-2  
XENON LAMPS

Leningrad OPTIKO-MEKHANICHESKAYA PROMYSHLENNOST' in Russian, No 1, Jan 78,  
pp 74-75, manuscript received 31 Jan 77

BARANOV, YU. P., SEROVA, N. M.

[Abstract] Very high pressure xenon lamps such as the lamp tested in this article are widely used as sunlight simulators in laboratory practice. This article presents the results of studies of the spectral density of energy brightness of the DKsSHRB-150-A-2 lamp in the 400-1000 nm spectral range. It was the purpose of the article to determine the change in this characteristic over the length of the arc discharge from the cathode to the anode; therefore, all experimental results are presented in relative units. The spectral density is found to change significantly over the length of the arc, which must be considered in the construction of optical systems using this lamp. Figures 4.

USSR

UDC 621.165

A BLADELESS SET OF GUIDE VANES FOR A RADIAL TURBINE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602689 30 Dec 76

SOKOLOV, A. I. and CHIZHOV, V. V., Order-of-Lenin Moscow Power Engineering  
Institute

[Text] A set of guide vanes including a helical chamber with an acceleration compartment and a longitudinal rib along the chamber periphery, with the distinguishing feature that, for a more efficient performance with moist gas, in the walls of the chamber on both sides of the rib there are moisture drainage holes connected to a moisture collector, while the acceleration compartment has profiled fins extending into the helical chamber through 0.2-0.3 of the diameter of the latter and forming with the walls of the latter moisture trapping pockets also connected to a respective moisture collectors.

USSR

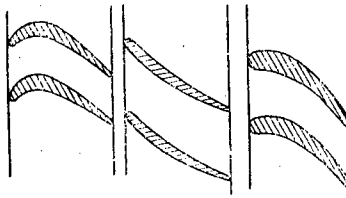
UDC 621.165-762.62

A SEAL FOR A TURBINE RUNNER

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 13, 5 Apr 78 Author's Certificate No 601435 8 Dec 76

KOSTYUK, A. G., SERKOV, S. A., and KIRYUKHIN, A. V., Order-of-Lenin Moscow  
Power Engineering Institute

[Text] A seal including a stationary row of guide vanes downstream of a labyrinth seal between stator and runner, with the distinguishing feature that, for increasing the runner stability under vibrations, before the guide vanes there is a compressor stage and behind them a chamber connected to the compressor inlet.



USSR

UDC 621.165

# A DEVICE FOR TURBINE OVERSPEED PROTECTION

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHELNNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596725 23 Jun 76

GOLOVACH, YE. A.

[Text] A device including runner velocity and acceleration transducers, an automatic safety interlock with the turbine valves, and a servomechanism for vacuum cutoff to the condenser, with a vacuum restoration signal generator at the condenser inlet, with the distinguishing feature that, for a higher turbine reliability, it also includes a nonlinear converter stage connected between the acceleration transducer and the vacuum restoration signal generator.

USSR

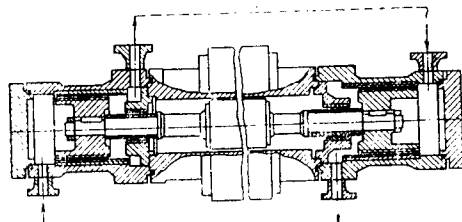
UDC 621.674

# A HERMETICALLY SEALED AND ELECTRICALLY DRIVEN TWO-STAGE LABYRINTH PUMP

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 13, 5 Apr 78 Author's Certificate No 601457 19 Jul 76

PIMENOV, A. P., NESTERENKO, V. B., MOROZOVA, V. R., and SHELUDYAKOV, YE. G.,  
Institute of Nuclear Power, Academy of Sciences of the Belorussian SSR

[Text] A pump for transfer of low-viscosity fluids which includes a runner and consecutive stages of rotating screws inside stationary cases, with the distinguishing feature that, for increasing the pump capacity by automatically relieving the impeller of axial loads and also for improving the manufacturability of the pump, these stages are located at opposite ends of the impeller and the second stage is longer than the first one, while the case of each stage protrudes beyond the respective screw on the outlet side.



USSR

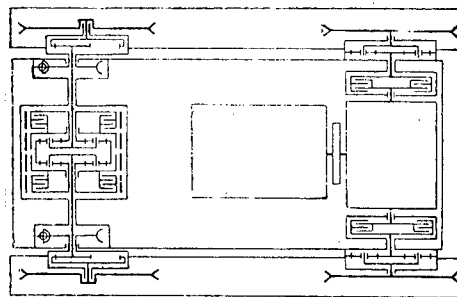
UDC 629.11.032

# A CATERPILLAR VEHICLE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 16, 30 Apr 78 Author's Certificate No 604735 13 Jun 76

MAZEPA, G. V. and DNEPROVSKIY, O. A.

[Text] 1. A caterpillar vehicle containing an engine with a slider-crank mechanism and a gear box on a chassis, and along each side of the chassis a caterpillar belt engaging a drive gear and a guide gear, with the distinguishing feature that, for a more stable operation of the caterpillars and their better meshing with the gears, the two drive gears are coupled to each other through the slider-crank mechanism while a controllable clutch has been installed between the transmission gear box and each caterpillar drive gear. 2. The same as 1., except that the slider-crank mechanism includes at least two planetary rows with drum brakes. 3. The same as 1., except that the controllable clutches are frictional.



USSR

UDC 621.867.52

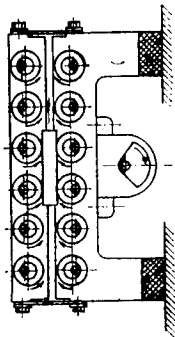
# A CONVEYOR

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 13, 5 Apr 78 Author's Certificate No 601205 27 Oct 75

YAKHIMOVICH, V. A., POGORELOV, B. V., and KAZAKOV, V. N., Sevastopol Institute of Instrument Design

[Text] 1. A conveyor including a straight load carrying member and a vibratory drive, with the distinguishing feature, that for increasing the output at large angles of inclination to the horizontal, the load carrier

consists of two bars coupled through springs and having pins over which rings have been slipped with a clearance, the stiffnesses of longitudinally and transversely acting **springs** having been selected in a ratio which ensures that the bars will vibrate longitudinally in phase opposition and transversely in phase. 2. The same as 1., except that the rings slipped over the bar pins are faceted around their outside surfaces and carry radial pins. 3. The same as 1., except that two rings are slipped over each bar pin, the inner ring without clearance and an elastic element separating it from the outer ring. 4. The same as 1., except that, for facilitating delivery of parts into several troughs, the pins with rings are located on both sides of each bar.



USSR

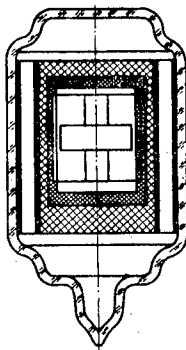
UDC 621.385:621.798

A CONTAINER FOR LENGTHY STORAGE OF A VACUUM DEVICE

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 13, 5 Apr 78 Author's Certificate No 601197 2 Aug 76

GOLANT, M. B. and RULEVA, N. N.

[Text] A container including an evacuated glass flask and a compartment into which the device is put for storage, with the distinguishing feature that, for shock absorbing during transport, the evacuated glass flask has inside its bulging part a spiral spring whose outermost turn tightly presses against the flask and innermost turn is attached to the compartment containing the stored device.



USSR

UDC 621.59

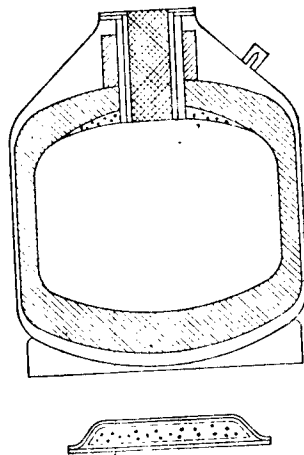
A CRYOGENIC VESSEL

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 14, 15 Apr 78 Author's Certificate No 602741 24 Feb 76

KAGANER, M. G. and YURCHIK, L. M.

[Text] A vessel inside a thermally insulating jacket under vacuum, including an inner container, a jacket, a thermally insulating material, and an absorber package, with the distinguishing feature that, for maintaining the absorber effectiveness and the deep vacuum by preventing any absorber material from falling into the insulation, the absorber packet is wrapped in a metal foil of polymer bag with a mesh enclosure inside.

9



USSR

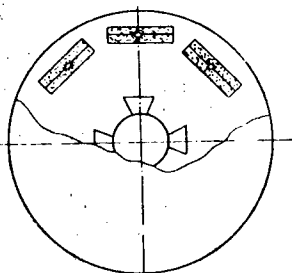
UDC 621.527.8

#### A CRYOGENIC SORPTION PUMP

Moscow OTKRYTIYA IZOBRETENIYA PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI  
in Russian, No 9, 5 Mar 78 Author's Certificate No 596731 9 Jul 76

YERMOKHIN, V. M., ISAYEV, A. V., KUPRIYANOV, V. I., CHOPOV, S. M., and  
SHUBAROV, YE. V.

[Text] A pump including a case with panels to be cooled inside, with the distinguishing feature that, for shortening the pre-evacuation time, inside the case is also a source of cryogenic fluid connected to nozzles with outlet orifices aiming at the panels.



END